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Primary Years Programme

Making the PYP happen:
A curriculum framework for international primary education

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IB mission statement

The International Baccalaureate aims to develop inquiring, knowledgeable and caring young people who help to create a better and more peaceful world through intercultural understanding and respect.

To this end the organization works with schools, governments and international organizations to develop challenging programmes of international education and rigorous assessment.

These programmes encourage students across the world to become active, compassionate and lifelong learners who understand that other people, with their differences, can also be right.

IB learner profile

The aim of all IB programmes is to develop internationally minded people who, recognizing their common humanity and shared guardianship of the planet, help to create a better and more peaceful world.

IB learners strive to be:

Inquirers They develop their natural curiosity. They acquire the skills necessary to conduct inquiry and research and show independence in learning. They actively enjoy learning and this love of learning will be sustained throughout their lives.

Knowledgeable They explore concepts, ideas and issues that have local and global significance. In so doing, they acquire in-depth knowledge and develop understanding across a broad and balanced range of disciplines.

Thinkers They exercise initiative in applying thinking skills critically and creatively to recognize and approach complex problems, and make reasoned, ethical decisions.

Communicators They understand and express ideas and information confidently and creatively in more than one language and in a variety of modes of communication. They work effectively and willingly in collaboration with others.

Principled They act with integrity and honesty, with a strong sense of fairness, justice and respect for the dignity of the individual, groups and communities. They take responsibility for their own actions and the consequences that accompany them.

Open-minded They understand and appreciate their own cultures and personal histories, and are open to the perspectives, values and traditions of other individuals and communities. They are accustomed to seeking and evaluating a range of points of view, and are willing to grow from the experience.

Caring They show empathy, compassion and respect towards the needs and feelings of others. They have a personal commitment to service, and act to make a positive difference to the lives of others and to the environment.

Risk-takers They approach unfamiliar situations and uncertainty with courage and forethought, and have the independence of spirit to explore new roles, ideas and strategies. They are brave and articulate in defending their beliefs.

Balanced They understand the importance of intellectual, physical and emotional balance to achieve personal well-being for themselves and others.

Reflective They give thoughtful consideration to their own learning and experience. They are able to assess and understand their strengths and limitations in order to support their learning and personal development.

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Introduction

Making the PYP happen: A curriculum framework for international primary education is an in-depth guide to all aspects of student learning in the context of the Primary Years Programme (PYP) of the International Baccalaureate (IB). Within the PYP it is believed student learning is best done when it is authentic—relevant to the "real" world; and transdisciplinary—where the learning is not confined within the boundaries of traditional subject areas but is supported and enriched by them. It is a programme that each student will engage with in ways that are developmentally appropriate and it is intended that schools will implement the programme in an inclusive manner.

It is a guide to curriculum in the traditional sense of a written set of objectives ("What do we want students to learn?") but also a guide to the theory behind, and application of, good classroom practice ("How best will they learn?"), and including effective and appropriate assessment ("How will we know what they have learned?"). Since the PYP curriculum is viewed as an articulated and iterative model, these three components of the curriculum model have been used to organize the implementation of the programme.

The PYP represents a combination of wide-ranging research and experience—excellent practice derived from a variety of national system and independent schools, and from IB World Schools offering a coherent programme of international education. In translating the thinking represented in this document into practice, it is essential for teachers to use the practical material that is included to plan their teaching and assessing, and to evaluate their work for successful implementation of the programme. *The PYP in the early childhood years (3–5 years)* (2000) and the *PYP assessment handbook* (2001) have now been incorporated into this revised document.

Making the PYP happen: A curriculum framework for international primary education is also a response to practical questions raised by school leaders who are often obliged to respond to pressures from many, sometimes conflicting, sources. It is likely that they might appreciate some support themselves, in the form of the best advice that the IB can offer—a concise, accessible overview of key issues linked to practical ideas for action. In the PYP, it is recognized that improvements, and therefore changes, in the classroom only happen in the context of overall school improvement. Given the vital role of the school's leadership in this process, it is clear that the implementation of the PYP curriculum framework will depend to a large extent on the support and, more importantly, the practical involvement of the school's leadership. Further support for PYP principals and coordinators can be found in *Making the PYP happen: Pedagogical leadership in a PYP school* (published separately).

The IB trusts that these publications will serve their purpose and prove to be useful resources as we work together to improve the quality of learning for students, teachers, parents and administrators in the international community of learners.

What are the beliefs and values that drive the PYP?

What do we believe international education to be?

A driving force behind the PYP is a deeply held philosophy about the nature of international education, a philosophy expressed in the statements that follow. Firstly, the mission statement of the IB expresses the IB's overall purpose as an organization promoting and developing programmes of international education. Secondly, the section "International-mindedness: the PYP perspective" sets out our beliefs and values as defined by the outcomes of student learning in PYP schools. The IB defines this learning through a learner profile that encompasses the aims of the curriculum.

Additionally, this section goes on to identify policies and practices within our schools that are worth examining and developing further as we strive to become ever more internationally minded communities of learners.

The mission statement of the International Baccalaureate
The International Baccalaureate aims to develop inquiring, knowledgeable and caring young people who help to create a better and more peaceful world through intercultural understanding and respect. To this end the organization works with schools, governments and international organizations to develop challenging programmes of international education and rigorous assessment. These programmes encourage students across the world to become active, compassionate and lifelong learners who understand that other people, with their differences, can also be right.

International-mindedness: the PYP perspective

In the PYP, the attempt to define international-mindedness in increasingly clear terms, and the struggle to move closer to that ideal in practice, are central to the mission of PYP schools.

Given the variety and complexity of PYP schools, and the elusive nature of the concept itself, it would be naive to propose any simple definition and expect it to stand up to rigorous examination. Rather, the IB would suggest that the definition is compound, reflecting a range of interrelated factors that are discussed throughout this document.

However, in examining these factors during the years since the inception of the PYP, one aspect of PYP schools emerges, not only as the most compelling, but also as the common ground on which PYP schools stand, the essence of what they are about. This is the kind of student we hope will graduate from a PYP school, the kind of student who, in the struggle to establish a personal set of values, will be laying the foundation upon which international-mindedness will develop and flourish. The attributes of such a learner are listed in the learner profile (see figure 1). The learner profile is central to the PYP definition of what it means to be internationally minded, and it directs schools to focus on the learning. IB World Schools should be proud to send out into the world students who exemplify the attributes expressed in this profile.

The IB is conscious that this learner profile is value-laden and, it would say, quite rightly so, for this kind of learning is what the IB supports, and it is the embodiment of what the IB believes about international education. The attributes described in the learner profile are appropriate to, and achievable by, all primary years students. The teacher needs to interpret these attributes in a manner appropriate to the age and development of the student. That said, part of the adaptability and versatility of the programme lies in what these attributes may look like from one school culture to another.

In the PYP, it is both recognized and appreciated that students come into the programme from various backgrounds and with a wealth of experience. All teachers have a responsibility to assess student development in the context of the IB learner profile; it affects all students throughout the programme. Schools have a responsibility on behalf of all students to assess and report on progress in the development of the attributes of the learner profile.

What, then, is a PYP school? It is a school that, regardless of location, size or constitution, strives towards developing an internationally minded person. What is an internationally minded person? It is a person who demonstrates the attributes of the IB learner profile.

IB learner profile

The aim of all IB programmes is to develop internationally minded people who, recognizing their common humanity and shared guardianship of the planet, help to create a better and more peaceful world.

IB learners strive to be:

Inquirers	They develop their natural curiosity. They acquire the skills necessary to conduct inquiry and research and show independence in learning. They actively enjoy learning and this love of learning will be sustained throughout their lives.
Knowledgeable	They explore concepts, ideas and issues that have local and global significance. In so doing, they acquire in-depth knowledge and develop understanding across a broad and balanced range of disciplines.
Thinkers	They exercise initiative in applying thinking skills critically and creatively to recognize and approach complex problems, and make reasoned, ethical decisions.
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Principled	They act with integrity and honesty, with a strong sense of fairness, justice and respect for the dignity of the individual, groups and communities. They take responsibility for their own actions and the consequences that accompany them.
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Caring	They show empathy, compassion and respect towards the needs and feelings of others. They have a personal commitment to service, and act to make a positive difference to the lives of others and to the environment.
Risk-takers	They approach unfamiliar situations and uncertainty with courage and forethought, and have the independence of spirit to explore new roles, ideas and strategies. They are brave and articulate in defending their beliefs.
Balanced	They understand the importance of intellectual, physical and emotional balance to achieve personal well-being for themselves and others.
Reflective	They give thoughtful consideration to their own learning and experience. They are able to assess and understand their strengths and limitations in order to support their learning and personal development.

Figure 1

Clearly, success in developing this profile will depend on more than just curriculum, even given the PYP inclusive definition of curriculum. It will depend on a multitude of factors, each contributing to overall success, each driven by beliefs and values embodied in the profile.

How does a PYP school develop international-mindedness within its community of learners?

In the context of the PYP, the school is considered to be a **community of learners**. The knowledge base that informs effective practice, particularly in the areas of brain research and cognition, is continually growing, and consequently teachers need to be, and be seen to be, lifelong learners. A school's commitment to effective ongoing professional development will be the hallmark of a school energetic enough and courageous enough to embrace change for the betterment of student learning. The effect that a commitment to implement the PYP has on a school culture is substantial in all cases, and breathtaking in some.

A PYP school needs to ensure that its **mission statement** is in line with that of the IB and that, together with the learner profile, it adds vitality to the life of the school community and has a particular impact on teaching and learning.

As well as presenting schools with a philosophical perspective on what international education may be, the PYP prescribes a **curriculum framework** of essential elements—knowledge, concepts, skills, attitudes, and action—each of which is reflected in the learner profile and is a reference point for the construction of a school's curriculum. How these essential elements help to frame the school's curriculum is explored later in this document.

One of these essential elements is the promotion of a particular set of **attitudes**—appreciation, commitment, confidence, cooperation, creativity, curiosity, empathy, enthusiasm, independence, integrity, respect and tolerance. Some attitudes contribute directly to individual attributes of the profile, for example, "empathy" to "caring", whereas some attitudes have a more pervasive influence on the development of many of the attributes of the profile. It would be simplistic to the point of incorrectness to assume a one-to-one correspondence between the attitudes and the attributes of the profile. It would also be difficult to claim that a focus on the development of the attitudes is necessarily a precursor to the development of the attributes of the learner profile. It is more likely that an awareness on the part of the students of the attitudes valued within the community, and an explicit demonstration of those attitudes on their part, will take place along with their development in the context of the learner profile.

The IB has developed **implementation standards** that are common across all its programmes, each of which is supported by a list of **required practices**. These standards have been developed to contribute to the complex model of international education that is exemplified by each of the programmes. For example, standard A2, relating to philosophy, states that "The school promotes international-mindedness on the part of the adults and the students in the school community", and a practice supporting that standard, A2.5, states "The school provides students with opportunities for learning about issues that have local, national and global significance, leading to an understanding of human commonalities."

It is appropriate to note at this point that there is a practice requiring a PYP school to offer a language, in addition to the language of instruction, to students from the age of 7. Exposing students to languages other than their mother tongue provides an insight into and an appreciation of other cultures, and an awareness of other perspectives. The complete list of standards and practices is available on the IB website, http://www.ibo.org, and in the *PYP coordinator's handbook*.

Through acknowledging and struggling to meet the diverse needs of the student—physical, social, intellectual, aesthetic, cultural—PYP schools ensure that the learning is **engaging**, **relevant**, **challenging** and **significant**. What adds significance to student learning in the PYP is its commitment to a **transdisciplinary**

model, whereby themes of global significance that transcend the confines of the traditional subject areas frame the learning throughout the primary years, including in the early years. These themes promote an awareness of the human condition and an understanding that there is a commonality of human experience. The students explore this common ground collaboratively, from the multiple perspectives of their individual experiences and backgrounds. This sharing of experience increases the students' awareness of, and sensitivity to, the experiences of others beyond the local or national community. It is central to the programme and a critical element in developing an international perspective, which must begin with each student's ability to consider and reflect upon the point of view of someone else in the same class.

On examining the learner profile and other listed factors that contribute to international-mindedness as demonstrated in a PYP school, it is tempting to point out that these elements would be desirable in national schools as well as in international schools. International-mindedness in education is, thankfully, not the sole property of international schools. It is an ideal towards which all schools should strive, but one that carries a greater imperative for PYP schools.

To summarize, when seeking evidence of international-mindedness in PYP schools, teachers need to look at what the students are learning, how they are demonstrating that learning, and how to nurture students within the school community. They need to consider whether students are making connections between life in school, life at home and life in the world. By helping students make these connections and see that learning is connected to life, a strong foundation for future learning is established. In striving to make it happen, and in looking for indicators of success, teachers, principals and/or heads of schools need to look everywhere, since all aspects of the school, from overarching philosophy through to policies and their ensuing practices, will reflect either the presence or the absence of a sensitivity to the special nature of PYP schools.

What do we believe about how children learn?

The PYP curriculum model is dependent on our commitment to a particular belief about how children learn, encapsulated most clearly in the constructivist approach. It is acknowledged that learners have beliefs about how the world works based on their experiences and prior learning. Those beliefs, models or constructs are revisited and revised in the light of new experiences and further learning. As we strive to make meaning of our lives and the world around us we travel continually on the cyclic path of constructing, testing, and confirming or revising our personal models of how the world works.

Vygotsky defined learning as "the creation of meaning that occurs when an individual links new knowledge with…existing knowledge" (Williams and Woods 1997). Consequently, when planning to teach it is important to ascertain students' prior knowledge, and provide experiences through the curriculum and through the environment that give them opportunities: to test and revise their models, to allow them to make connections between their previous and current perceptions, to allow them the freedom to construct their own meaning.

Other theorists, including Bruner (1990) and Gardner (1993), have also argued that the focus of teaching curriculum content needs to change to enable teachers to make connections between learners' existing knowledge and their individual learning styles in the context of new experiences. This challenge is addressed in the PYP by providing opportunities for students to build meaning and refine understanding, principally through structured **inquiry**. As students' learning and their attempts to understand the world around them are essentially social acts of communication and collaboration, this inquiry may take many forms, with students working sometimes on their own, with partners, or in larger groups.

In PYP schools, the teachers' structuring of new experiences, and the support they give to students' ideas about new experiences, are fundamental to students' knowledge, understanding, and conceptual development—the ability to have an understanding of abstract concepts, to make links between them, and

to think conceptually. In the PYP it is recognized that development and learning are interrelated, and the PYP curriculum framework allows for concept development that applies across and beyond subject-specific areas.

The programme supports the student's struggle to gain understanding of the world and to learn to function comfortably within it, to move from not knowing to knowing, to identify what is real and what is not real, to acknowledge what is appropriate and what is not appropriate. To do this, the student must integrate a great deal of information, and apply this accumulation of knowledge in a cohesive and effective way.

In the PYP, it is believed that learning takes place best when it is connected to what is genuinely a component of the world around the student, not merely what is all too often contrived and then imposed upon the student in school; that the acquisition of knowledge and skills and the search for meaning and understanding are best done in the context of the exploration of relevant content. PYP schools should provide students with learning experiences that are engaging, relevant, challenging and significant, in learning environments that are stimulating and provocative, where:

- adults are sensitive facilitators of the process of empowering students to value their learning and to take responsibility for it
- students are seen as competent and are listened to
- students are encouraged to be curious, be inquisitive, ask questions, explore and interact with the environment physically, socially and intellectually
- explicit learning outcomes and the learning process are made transparent to the students
- students are supported in their struggle for mastery and control on their journey to become independent, autonomous learners
- the learning experiences are differentiated to accommodate the range of abilities and learning styles in the group
- the collaboration on the part of all the PYP teachers is high, and there is a commitment to the transdisciplinary model at the core of this programme of international education.

In the PYP, it is acknowledged that experiences during the **early years** lay the foundations for all future learning. Research indicates that the rapid rate of development that occurs in the physical, social, emotional, intellectual and aesthetic domains is particularly significant. It is our responsibility as educators to recognize and maximize this crucial stage of learning.

Although development usually occurs in recognizable and predictable directions, it is unique in each child, occurring at varying rates from child to child, and inconsistently for each child. For many children, these early years also mark the first transition from home to group experiences outside of the family and to new physical environments. The school must strive to make this adjustment as successful as possible by encouraging the development of secure and trusting relationships with new adults and peers.

Teachers of students in the early years are encouraged to support students' interests, build up their self-esteem and confidence, and respond to spontaneous events, as well as support the development of skills in all cognitive areas in relevant ways. Children, from birth, are full of curiosity, and the PYP provides a framework that gives crucial support for them to be active inquirers and lifelong learners.

What is curriculum?

An aim of the PYP is to create a transdisciplinary curriculum that is engaging, relevant, challenging and significant for learners in the 3–12 age range. In developing a curriculum of international education for primary school students, the PYP definition of curriculum is broad and inclusive. The IB believes that:

- all students should be supported to participate in the programme to the fullest extent possible
- the school's curriculum includes all those student activities, academic and non-academic, for which the school takes responsibility, since they all have an impact on student learning.

A PYP school needs to demonstrate that all teaching and learning for which it is responsible is seen as an interpretation of the PYP in action. The influence of the PYP is pervasive within a school and has an explicit impact on all aspects of the functioning of the school community. The school community needs to accept that the effect of the PYP will be systemic and all encompassing, so that change takes place within the school for the betterment of all students. One of the aims of the PYP is to ensure that students experience coherence in their learning, regardless of which teacher has responsibility for them at any particular point in time.

Furthermore, given the PYP commitment to continuous school improvement, it is obvious that the development of **the written curriculum**, the expression of issues, concepts and ideas on paper, is necessary; but, equally obviously, this alone is not sufficient.

The interpretation of the commonalities of the written curriculum into daily practice by teachers, working in schools around the world, strengthens the connections within the global community of PYP schools. In the PYP, therefore, equal emphasis is given to methodology, to **the taught curriculum**, to suggestions for examining and improving our practice and to the provision of in-service support.

The third component in the PYP definition of curriculum, **the assessed curriculum**, is concerned with the assessment of the actual learning that takes place for each student, a component that can often be neglected or inappropriately practised. The development of a range of authentic and targeted assessment strategies, focused on the learning, brings balance and integrity to the curriculum and reminds teachers of its purpose.

The PYP definition of curriculum, then, emerges as comprising three interrelated components. In keeping with the PYP commitment to inquiry, these three components are expressed in the form of the following three open-ended questions, each of which compels teachers to think deeply about their own practice with regard to student learning.

What do we want to learn?	**The written curriculum** the identification of a framework of what's worth knowing
How best will we learn?	**The taught curriculum** the theory and application of good classroom practice
How will we know what we have learned?	**The assessed curriculum** the theory and application of effective assessment

In the PYP the pronoun "we" is used in each question, rather than referring directly to the students, for reasons that reflect the PYP belief about a school being a community of learners. While recognizing that a

school's primary responsibility is for student learning, a school is encouraged to see itself as a community where everyone is a learner, where teachers must continually learn about the needs and capabilities of each student, the content with which they are engaged, and about their own practice and ongoing professional development.

Presenting the questions in this form prompts teachers to present them in a similar way to students, providing an opportunity to make them aware of the curriculum framework and of the uniqueness of the PYP, and directly engaging them in thinking about their own learning.

In PYP documents, these three questions are presented as a composite curriculum model where each component is equally valued. In figure 2, the double-headed arrows indicate that developing, implementing and assessing the school's curriculum is an iterative process, whereby each component informs the other two. This is not a linear curriculum model that ends with the assessment component. Rather, it illustrates a process that is more finely tuned, whereby all three components are woven together throughout. Most certainly it requires that consideration of the assessment of the learning be thought about much sooner, and in more depth, than is traditionally the case.

Learners constructing meaning: the PYP definition of curriculum

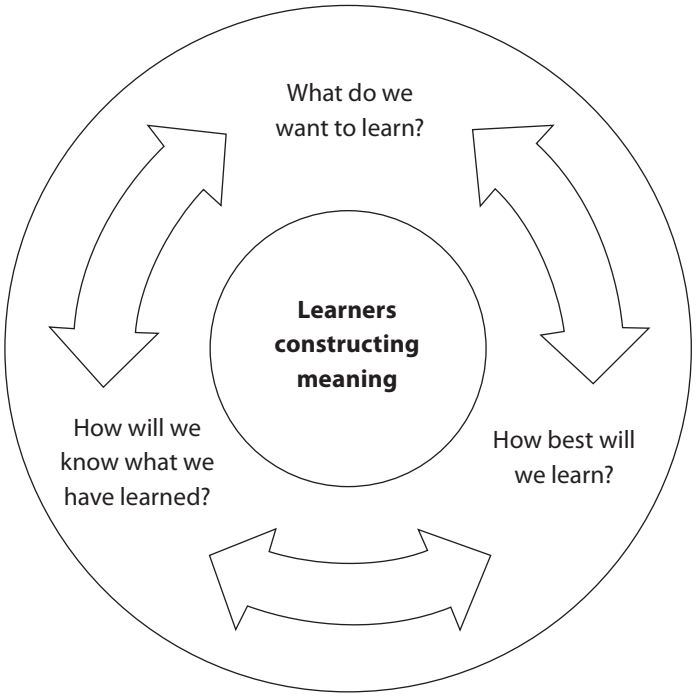

Figure 2

What do we want to learn? The written curriculum

In the PYP a balance is sought between acquisition of essential knowledge and skills, development of conceptual understanding, demonstration of positive attitudes, and taking of responsible action.

In terms of achieving this balance, the five essential elements of the written curriculum are emphasized. They are shown in figure 3.

Essential elements of the written curriculum	
Knowledge	Significant, relevant content that we wish the students to explore and know about, taking into consideration their prior experience and understanding.
Concepts	Powerful ideas that have relevance within the subject areas but also transcend them and that students must explore and re-explore in order to develop a coherent, in-depth understanding.
Skills	Those capabilities that the students need to demonstrate to succeed in a changing, challenging world, which may be disciplinary or transdisciplinary in nature.
Attitudes	Dispositions that are expressions of fundamental values, beliefs and feelings about learning, the environment and people.
Action	Demonstrations of deeper learning in responsible behaviour through responsible action; a manifestation in practice of the other essential elements.

Figure 3

The PYP written curriculum should be planned and used in a developmentally appropriate way; it should take into account what students should learn and be able to do on the basis of what is best for their development in the long term, rather than simply on the basis of what works in the short term. It should be based on each student's needs, interests and competencies. This developmental approach takes into account:

- the characteristics, capabilities and interests that are normal for the age group
- the different rates at which students learn and the wide range of normal variation that can occur in an age group
- that individual patterns of development are complex and not simply sequential
- that learning is a balance between the intellectual, the social and the personal; each is important and each is interlinked with the others
- that the maturity of each student depends on the developmental stages he or she has already gone through, and the effects of earlier positive and negative feedback.

Although the five essential elements are presented under the written curriculum, they resonate throughout the entire PYP curriculum model.

In the sections that follow, each of these elements is explored more fully so that the reader may gain an insight into the importance of each element, how and why it has been selected, and how it will be incorporated into classroom practice.

Knowledge: what do we want students to know about?

Is it possible to identify a particular body of knowledge for PYP schools?

Due to the particular difficulties faced by schools implementing a programme of international education, it is immensely important that the PYP curriculum model includes an outline of a coherent, flexible and interpretive written curriculum that frames a body of knowledge which supports the IB, its mission statement and its learner profile. This decision is driven by the belief that there are areas of knowledge that, while important for any student, are especially **significant** in schools that aim to promote international-mindedness on the part of their students.

The importance of the traditional subject areas is acknowledged: language; mathematics; social studies; science; personal, social and physical education; and the arts; and indeed these are specified as components of the PYP curriculum model. The knowledge, concepts and skills that constitute the essence of each of these subject areas, as reflected in the PYP, can be found in the annex at the back of this document.

In addition, overall expectations for each subject, within each age range, are specified in detailed **scope and sequence** documents. These are available to schools as exemplar material. While some schools may adopt these scope and sequences, other PYP schools may choose to use locally or nationally determined subject-based syllabuses. In the PYP, information and communication technology (ICT) is not identified as a particular subject area, but is recognized as a tool that facilitates learning throughout the curriculum.

However, it is also recognized that educating students in a set of isolated subject areas, while necessary, is not sufficient. Of equal importance is the need to acquire skills in context, and to explore content that is relevant to students, and transcends the boundaries of the traditional subjects. "To be truly educated, a student must also make connections across the disciplines, discover ways to integrate the separate subjects, and ultimately relate what they learn to life" (Boyer 1995). Ernest Boyer proposed that students explore a set of themes that represents shared human experiences such as "response to the aesthetic" and "membership in groups". He referred to these as "core commonalities".

Boyer's work has been seminal to the development of the PYP. Debate and discussion, representing multiple perspectives, about this idea of human commonalities has led to the selection of six transdisciplinary themes (see figure 4) that are considered essential in the context of a programme of international education. These themes:

- have global significance—for all students in all cultures
- offer students the opportunity to explore the commonalities of human experience
- are supported by knowledge, concepts and skills from the traditional subject areas but utilize them in ways that transcend the confines of these subjects, thereby contributing to a transdisciplinary model of teaching and learning
- will be revisited throughout the students' years of schooling, so that the end result is immersion in broad-ranging, in-depth, articulated curriculum content
- contribute to the common ground that unifies the curriculums in all PYP schools.

PYP transdisciplinary themes
Who we are
An inquiry into the nature of the self; beliefs and values; personal, physical, mental, social and spiritual health; human relationships including families, friends, communities, and cultures; rights and responsibilities; what it means to be human.
Where we are in place and time
An inquiry into orientation in place and time; personal histories; homes and journeys; the discoveries, explorations and migrations of humankind; the relationships between and the interconnectedness of individuals and civilizations, from local and global perspectives.
How we express ourselves
An inquiry into the ways in which we discover and express ideas, feelings, nature, culture, beliefs and values; the ways in which we reflect on, extend and enjoy our creativity; our appreciation of the aesthetic.
How the world works
An inquiry into the natural world and its laws; the interaction between the natural world (physical and biological) and human societies; how humans use their understanding of scientific principles; the impact of scientific and technological advances on society and on the environment.
How we organize ourselves
An inquiry into the interconnectedness of human-made systems and communities; the structure and function of organizations; societal decision-making; economic activities and their impact on humankind and the environment.
Sharing the planet
An inquiry into rights and responsibilities in the struggle to share finite resources with other people and with other living things; communities and the relationships within and between them; access to equal opportunities; peace and conflict resolution.

Figure 4

Students inquire into, and learn about, these globally significant issues in the context of **units of inquiry**, each of which addresses a **central idea** relevant to a particular transdisciplinary theme. Lines of inquiry are identified in order to explore the scope of the central idea for each unit (see figure 5).

These units collectively constitute the school's **programme of inquiry**, a sample of which is available on the IB online curriculum centre (OCC) at http://occ.ibo.org. The transdisciplinary themes provide a basis for much discussion and interpretation within a school, and allow for both local and global perspectives to be explored in the units. Consequently, it would be inappropriate for the PYP to attempt to produce a definitive programme of inquiry to be used by all schools. In fact, the PYP philosophy and practices have more of an impact on a school's culture when the individuals in the school work collaboratively to develop

a transdisciplinary programme of inquiry designed to meet the school's needs. Schools should explore the possibilities for links between the units taught at each year level, and also across the different age ranges, so that the programme of inquiry is articulated both vertically and horizontally.

Examples of central ideas and corresponding lines of inquiry

Transdisciplinary theme: How we organize ourselves

Title of unit of inquiry: Our school (for 4–5 year olds)

Central idea: Schools are organized to help us learn and play together.

An inquiry into:

- what a school is
- what we do in school
- how our school works
- who works in our school and the jobs they do.

Transdisciplinary theme: How we express ourselves

Title of unit of inquiry: The impact of advertising (for 9–10 year olds)

Central idea: Advertising influences how we think and the choices we make.

An inquiry into:

- the purpose of advertising
- the types, styles and locations of advertisements
- the devices used to make advertising effective and to influence our choices (use of language, images and sounds)
- the connection between advertising and target groups, particularly children.

Transdisciplinary theme: Who we are

Title of unit of inquiry: Learning to live, living to learn (for 11–12 year olds)

Central idea: Learning is a fundamental characteristic of humans that connects them to the world.

An inquiry into:

- what learning is and how we construct meaning
- how the brain functions
- human behaviour and responses to change.

Figure 5

In developing an individual unit of inquiry, organized around a central idea, the following are proposed as useful criteria. Each unit should be:

Engaging Of interest to the students, and involving them actively in their own learning.

Relevant Linked to the students' prior knowledge and experience, and current circumstances, and therefore placing learning in a context connected to the lives of the students.

Challenging Extending the prior knowledge and experience of the students to increase their competencies and understanding.

Significant Contributing to an understanding of the transdisciplinary nature of the theme, and therefore to an understanding of commonality of human experiences.

It is necessary to achieve a balance between the programme of inquiry and any additional single-subject teaching. Consequently, the planning teams, usually consisting of the teachers at each year level, need to plan the units of inquiry together with the remainder of the curriculum for the year. The relationship between the subject areas and the units of inquiry will change from one unit to another. In teasing out this relationship, it is worth considering the distinctions that Michael Halliday (1980) made about language learning: that students learn language, learn about language, and learn through language. These distinctions are worth reflecting upon for all subject areas.

It would be a useful exercise for each planning team to assess the dynamic relationship between the programme of inquiry and single-subject teaching, from one unit to the other, to ensure the programme of inquiry remains the definitive experience from the students' standpoint (see figure 6).

Organization of time during a unit of inquiry

Transdisciplinary theme: How we organize ourselves

Unit title: The marketplace

Length of unit: 4 weeks

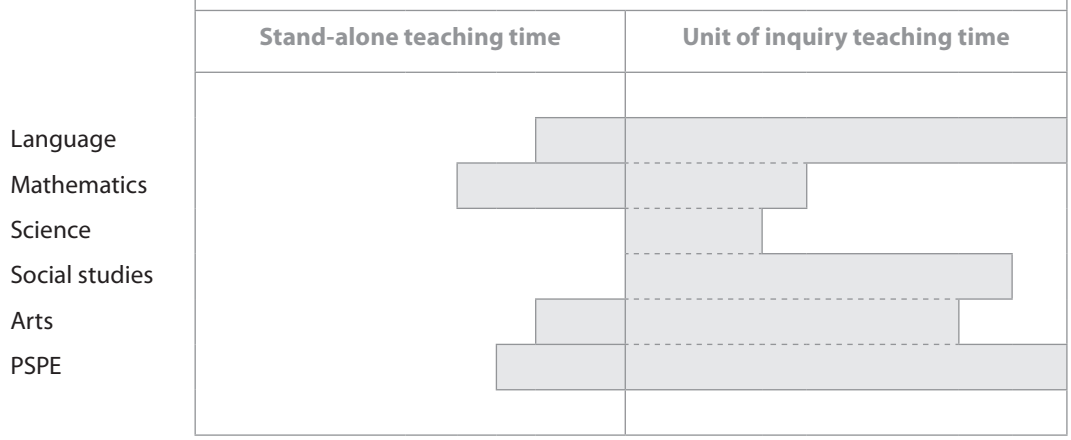

Figure 6

A **whole-school approach** should be taken when developing and refining a programme of inquiry. The proposed units of inquiry for each year level need to be articulated from one year to the other to ensure both horizontal and vertical articulation. This will ensure a robust programme of inquiry that provides students with experiences that are coherent and connected throughout their time in the school.

The intent of this document is to describe as unambiguously as possible what the PYP is; but the opportunity should also be taken to explain what the PYP is not. In this case, it is important to understand that the transdisciplinary programme of inquiry is not merely a novel way of repackaging subject-specific content.

The driving question to be asked each year is "What is really worth knowing that allows students' understanding of the transdisciplinary themes to develop and evolve?" The PYP, because of its commitment to transdisciplinary learning, allows schools to cut down on the amount of subject-specific content they may have been in the habit of delivering. Many PYP schools do not have autonomy in deciding what needs to be covered in the subject areas. That notwithstanding, it is advocated strongly that the principle of "less is more" should apply. The transdisciplinary themes provide the framework for a highly defined, focused, in-depth programme that eliminates redundancy and avoids the pitfalls of a personality-driven curriculum. The collaboration that is required on the part of all the PYP teachers in a school to develop a programme of inquiry means that it will have a resilience above and beyond the talents and resourcefulness of individual teachers in the school.

Concepts: what do we want students to understand?

Why include concepts as an essential element?

Central to the philosophy of the PYP is the principle that purposeful, structured inquiry is a powerful vehicle for learning that promotes meaning and understanding, and challenges students to engage with significant ideas. Hence in the PYP there is also a commitment to a **concept-driven curriculum** as a means of supporting that inquiry.

The decision to structure the PYP curriculum around important concepts is driven by the following beliefs.

- Education for the understanding of significant ideas has often been sacrificed for the memorization of isolated facts and the mastery of skills out of context. The expansion of the curriculum and the pressure to cover the syllabus have resulted in many students leaving school with superficial levels of understanding.
- By starting with the students' prior knowledge, and by confronting and developing their earlier conceptions and constructs, teachers can begin to promote real understanding.
- The exploration and re-exploration of concepts lead students towards an appreciation of ideas that transcend disciplinary boundaries, as well as towards a sense of the essence of each subject area. Students gradually work towards a deepening of their conceptual understanding as they approach those concepts from a range of perspectives.
- Transdisciplinary units, where concepts are used to support and structure the inquiries, provide a context in which students can understand and, at the same time, acquire essential knowledge, skills and attitudes.
- A concept-driven curriculum helps the learner to construct meaning through improved critical thinking and the transfer of knowledge.
- Transdisciplinary concepts increase coherence across the curriculum.

By identifying concepts that have relevance within each subject area, and across and beyond all subject areas, the PYP has defined an essential element for supporting its transdisciplinary model of teaching and learning. These concepts provide a structure for the exploration of significant and authentic content. In the course of this exploration, students deepen their understanding of the concepts.

Is it possible to identify a set of concepts around which to structure a curriculum?

The early developers of the programme analysed curriculum models used in different national systems and in international schools. This analysis focused, firstly, on whether there was a consensus on a set of concepts in which each has universal significance, and secondly, on the role given to concepts in the various curriculum models. The developers concluded that there are clusters of important ideas that can be grouped usefully under a set of overarching or key concepts, each of which has major significance, regardless of time or place, within and across disciplines.

Consequently, the PYP provides a framework for the curriculum, including key concepts as one of the essential elements. It is accepted that these are not, in any sense, the only concepts worth exploring. Taken together, they form a powerful curriculum component that drives the teacher- and/or student-constructed inquiries that lie at the heart of the PYP curriculum.

The key concepts, also expressed as key questions, help teachers and students to consider ways of thinking and learning about the world, and act as a provocation to extend and deepen student inquiries.

Which concepts were chosen and why?

A set of eight concepts was drawn up, each of which, it is felt, is of major importance in the design of a transdisciplinary curriculum. These concepts are:

- form
- function
- causation
- change
- connection
- perspective
- responsibility
- reflection.

Each of these key concepts is presented in figure 7 together with:

A key concept question	The key question that arises from this concept, presented in the form most useful for supporting inquiry. Each key question is presented here in its most basic, generic form, for example, "What is it like?" When working on a unit of inquiry focused on a central idea linked to a particular subject area strand, the question may be more specific, for example, "What is this place like?"
A definition	A generic explanation, provided so that everyone using the curriculum is working with a common understanding of terms.

A rationale

The reasons for the selection of the concept as an important structural component for working with students in an international programme of education.

Examples of related concepts

Some examples of concepts derived from the subject areas that relate to the key concept, provided as a springboard for the generation of further lines of inquiry.

The related concepts deepen an understanding of the subject areas while providing further opportunities to make connections throughout the learning, from one subject to another, and between disciplinary and transdisciplinary learning.

In what sense do these concepts drive the curriculum?

The concepts that are central to the curriculum are presented in the form of key questions. It is these questions, used flexibly by teachers and students when planning an inquiry-based unit, that shape that unit, giving it direction and purpose. It is in this sense that the key questions, and the concepts to which they relate, are said to drive the PYP curriculum.

- Since inquiry is a vehicle for learning in the PYP, the natural way to present the key concepts is in the form of broad, open-ended questions.
- Presented in this way, the concepts liberate the thinking of teachers and students, suggesting a range of further questions, each one leading to productive lines of inquiry.
- When viewed as a set of questions, the concepts form a research tool that is both manageable and open-ended. The concepts are not only key in the sense of important; they also provide a key—a way into a body of knowledge through structured and sustained inquiry. They place no limits on breadth of knowledge or on depths of understanding, and therefore provide access to every student, regardless of particular aptitudes.
- These questions should not be interpreted in any restrictive sense as the only questions, to be used in strict order, or to be given equal weight in every inquiry. Rather, they represent an approach, a springboard, an introduction to a way of thinking about teaching and learning. The most relevant key concepts should be identified and documented in every unit of inquiry.

In summary, the PYP concepts underpin student inquiries throughout the planned and unplanned curriculum. It is also recognized that these concepts have different interpretations and applications as students develop and deepen their understanding, in the context of transdisciplinary units, and across each subject area. The concepts, with their generic perceptions, together with the subject-specific perceptions, can be found in the annex at the end of this document.

PYP key concepts and related questions

Form	
Key question	What is it like?
Definition	The understanding that everything has a form with recognizable features that can be observed, identified, described and categorized.
Rationale	This concept was selected because the ability to observe, identify, describe and categorize is fundamental to human learning within and across all disciplines.
Examples of related concepts	Properties, structure, similarities, differences, pattern.

Function	
Key question	How does it work?
Definition	The understanding that everything has a purpose, a role or a way of behaving that can be investigated.
Rationale	This concept was selected because the ability to analyse function, role, behaviour and the ways in which things work is fundamental to learning within and across all disciplines.
Examples of related concepts	Behaviour, communication, pattern, role, systems.

Causation	
Key question	Why is it like it is?
Definition	The understanding that things do not just happen, that there are causal relationships at work, and that actions have consequences.
Rationale	This concept was selected because of the importance of prompting students to ask "Why?" and of helping them to recognize that actions and events have reasons and consequences. The analysis of causal relationships is significant within and across all disciplines.
Examples of related concepts	Consequences, sequences, pattern, impact.

Figure 7

PYP key concepts and related questions

Change	
Key question	How is it changing?
Definition	The understanding that change is the process of movement from one state to another. It is universal and inevitable.
Rationale	This concept was selected, not only because it is such a universal feature of all existence, but also because it has particular relevance to students developing international-mindedness who are growing up in a world in which the pace of change, both local and global, is accelerating.
Examples of related concepts	Adaptation, growth, cycles, sequences, transformation.

Connection	
Key question	How is it connected to other things?
Definition	The understanding that we live in a world of interacting systems in which the actions of any individual element affect others.
Rationale	This concept was selected because of the importance of appreciating that nothing exists in a vacuum but, rather, as an element in a system; that the relationships within and among systems are often complex, and that changes in one aspect of a system will have consequences, even though these may not be immediately apparent; that we must consider the impact of our actions on others, whether at the immediate, personal level or at the level of far-reaching decisions affecting environments and communities.
Examples of related concepts	Systems, relationships, networks, homeostasis, interdependence.

Perspective	
Key question	What are the points of view?
Definition	The understanding that knowledge is moderated by perspectives; different perspectives lead to different interpretations, understandings and findings; perspectives may be individual, group, cultural or disciplinary.
Rationale	This concept was selected because of the compelling need to develop in students the disposition towards rejecting simplistic, biased interpretations, towards seeking and considering the points of view of others, and towards developing defensible interpretations.
Examples of related concepts	Subjectivity, truth, beliefs, opinion, prejudice.

Figure 7 (continued)

PYP key concepts and related questions

Responsibility	
Key question	What is our responsibility?
Definition	The understanding that people make choices based on their understandings, and the actions they take as a result do make a difference.
Rationale	This concept was selected because of the need to develop in students the disposition towards identifying and assuming responsibility, and towards taking socially responsible action. This concept is directly linked to the action component, one of the essential elements in the PYP curriculum.
Examples of related concepts	Rights, citizenship, values, justice, initiative.

Reflection	
Key question	How do we know?
Definition	The understanding that there are different ways of knowing, and that it is important to reflect on our conclusions, to consider our methods of reasoning, and the quality and the reliability of the evidence we have considered.
Rationale	This concept was selected for a series of interrelated reasons. It challenges the students to examine their evidence, methods and conclusions. In doing so, it extends their thinking into the higher order of metacognition, begins to acquaint them with what it means to know in different disciplines, and encourages them to be rigorous in examining evidence for potential bias or other inaccuracy.
Examples of related concepts	Review, interpretation, evidence, responsibility, behaviour.

Figure 7 (continued)

Skills: what do we want students to be able to do?

Why include skills as an essential element?

The search for understanding is central to the beliefs and practices of the PYP. However, the emphasis on the development of conceptual understanding does not preclude a recognition of the importance of developing skills. The construction of meaning and, therefore, of understanding is complemented by the students acquiring and applying a range of skills. These skills are best developed in the context of authentic situations such as those offered through the PYP units of inquiry.

While it is important for all teachers to foster and support the development of skills by providing opportunities embedded in authentic learning experiences, it is particularly relevant for teachers of the younger students to interpret this expectation in ways that are appropriate for their group of learners.

When learning about and through the subject areas, students acquire the particular skills that define the discipline of those subjects. For example, in language the students become literate, and in mathematics they become numerate. The acquisition of literacy and numeracy, in its broadest sense, is essential, as these skills provide students with the tools of inquiry. Nonetheless, the PYP position is that, in order to conduct purposeful inquiry and in order to be well prepared for lifelong learning, students need to master a whole range of skills beyond those normally referred to as basic. These include skills, relevant to all the subject areas and also transcending them, needed to support fully the complexities of the lives of the students.

What transdisciplinary skills does the PYP suggest?

Within their learning throughout the programme, students acquire and apply a set of transdisciplinary skills: social skills, communication skills, thinking skills, research skills and self-management skills (see figure 8). These skills are valuable, not only in the units of inquiry, but also for any teaching and learning that goes on within the classroom, and in life outside the school.

PYP transdisciplinary skills

Thinking skills	
Acquisition of knowledge	Gaining specific facts, ideas, vocabulary; remembering in a similar form.
Comprehension	Grasping meaning from material learned; communicating and interpreting learning.
Application	Making use of previously acquired knowledge in practical or new ways.
Analysis	Taking knowledge or ideas apart; separating into component parts; seeing relationships; finding unique characteristics.
Synthesis	Combining parts to create wholes; creating, designing, developing and innovating.
Evaluation	Making judgments or decisions based on chosen criteria; standards and conditions.
Dialectical thought	Thinking about two or more different points of view at the same time; understanding those points of view; being able to construct an argument for each point of view based on knowledge of the other(s); realizing that other people can also take one's own point of view.
Metacognition	Analysing one's own and others' thought processes; thinking about how one thinks and how one learns.

Figure 8

PYP transdisciplinary skills

Social skills	
Accepting responsibility	Taking on and completing tasks in an appropriate manner; being willing to assume a share of the responsibility.
Respecting others	Listening sensitively to others; making decisions based on fairness and equality; recognizing that others' beliefs, viewpoints, religions and ideas may differ from one's own; stating one's opinion without hurting others.
Cooperating	Working cooperatively in a group; being courteous to others; sharing materials; taking turns.
Resolving conflict	Listening carefully to others; compromising; reacting reasonably to the situation; accepting responsibility appropriately; being fair.
Group decision-making	Listening to others; discussing ideas; asking questions; working towards and obtaining consensus.
Adopting a variety of group roles	Understanding what behaviour is appropriate in a given situation and acting accordingly; being a leader in some circumstances, a follower in others.

Communication skills	
Listening	Listening to directions; listening to others; listening to information.
Speaking	Speaking clearly; giving oral reports to small and large groups; expressing ideas clearly and logically; stating opinions.
Reading	Reading a variety of sources for information and pleasure; comprehending what has been read; making inferences and drawing conclusions.
Writing	Recording information and observations; taking notes and paraphrasing; writing summaries; writing reports; keeping a journal or record.
Viewing	Interpreting and analysing visuals and multimedia; understanding the ways in which images and language interact to convey ideas, values and beliefs; making informed choices about personal viewing experiences.
Presenting	Constructing visuals and multimedia for a range of purposes and audiences; communicating information and ideas through a variety of visual media; using appropriate technology for effective presentation and representation.
Non-verbal communication	Recognizing the meaning of visual and kinesthetic communication; recognizing and creating signs; interpreting and utilizing symbols.

Figure 8 (continued)

PYP transdisciplinary skills

Self-management skills	
Gross motor skills	Exhibiting skills in which groups of large muscles are used and the factor of strength is primary.
Fine motor skills	Exhibiting skills in which precision in delicate muscle systems is required.
Spatial awareness	Displaying a sensitivity to the position of objects in relation to oneself or each other.
Organization	Planning and carrying out activities effectively.
Time management	Using time effectively and appropriately.
Safety	Engaging in personal behaviour that avoids placing oneself or others in danger or at risk.
Healthy lifestyle	Making informed choices to achieve a balance in nutrition, rest, relaxation and exercise; practising appropriate hygiene and self-care.
Codes of behaviour	Knowing and applying appropriate rules or operating procedures of groups of people.
Informed choices	Selecting an appropriate course of action or behaviour based on fact or opinion.

Research skills	
Formulating questions	Identifying something one wants or needs to know and asking compelling and relevant questions that can be researched.
Observing	Using all the senses to notice relevant details.
Planning	Developing a course of action; writing an outline; devising ways of finding out necessary information.
Collecting data	Gathering information from a variety of first- and second-hand sources such as maps, surveys, direct observation, books, films, people, museums and ICT.
Recording data	Describing and recording observations by drawing, note taking, making charts, tallying, writing statements.
Organizing data	Sorting and categorizing information; arranging into understandable forms such as narrative descriptions, tables, timelines, graphs and diagrams.
Interpreting data	Drawing conclusions from relationships and patterns that emerge from organized data.
Presenting research findings	Effectively communicating what has been learned; choosing appropriate media.

Figure 8 (continued)

Attitudes: what do we want students to feel, value and demonstrate?

Why include attitudes as an essential element?

While recognizing the importance of knowledge, concepts and skills, these alone do not make an internationally minded person. It is vital that there is also focus on the development of personal attitudes towards people, towards the environment and towards learning, attitudes that contribute to the well-being of the individual and of the group. By deciding that attitudes (see figure 9) need to be an essential element of the programme, the PYP is making a commitment to a values-laden curriculum.

What attitudes does the PYP suggest that schools should encourage?

PYP attitudes	
In PYP schools, students should demonstrate:	
Appreciation	Appreciating the wonder and beauty of the world and its people.
Commitment	Being committed to their own learning, persevering and showing self-discipline and responsibility.
Confidence	Feeling confident in their ability as learners, having the courage to take risks, applying what they have learned and making appropriate decisions and choices.
Cooperation	Cooperating, collaborating, and leading or following as the situation demands.
Creativity	Being creative and imaginative in their thinking and in their approach to problems and dilemmas.
Curiosity	Being curious about the nature of learning, about the world, its people and cultures.
Empathy	Imagining themselves in another's situation in order to understand his or her reasoning and emotions, so as to be open-minded and reflective about the perspectives of others.
Enthusiasm	Enjoying learning and willingly putting the effort into the process.
Independence	Thinking and acting independently, making their own judgments based on reasoned argument, and being able to defend their judgments.
Integrity	Being honest and demonstrating a considered sense of fairness.
Respect	Respecting themselves, others and the world around them.
Tolerance	Being sensitive about differences and diversity in the world and being responsive to the needs of others.

Figure 9

As the attributes of the IB learner profile are relevant to both students and adults in a PYP school, so too are the PYP attitudes. They need to be interpreted and modelled for students. The purpose of the modelling is not to encourage students to mimic but to provide support—a metacognitive framework—to help students reflect on and develop their own set of values, albeit in the context of that being demonstrated.

The teacher should look for authentic demonstrations of these attitudes in the daily lives of the students in order to raise an awareness of, and build an appreciation for them. The attitudes should not be part of a hidden curriculum but should be part of the vernacular of the PYP classroom, explicitly part of classroom discussions, and reflected in teachers' anecdotal records. They should also be addressed explicitly within the taught and assessed components of the curriculum so that learning experiences and assessment strategies are designed to support and promote the attitudes.

The descriptions of the attitudes are to some degree a reflection of parts of the IB learner profile. Although this congruency is understandable, the attitudes should be considered as "habits of mind" that inform curriculum decisions made across all three components of the PYP curriculum model. Their impact will affect deeply the learning environment and the personal interactions that occur within it.

Action: how do we want students to act?

Why include action as an essential element?

In the PYP, it is believed that education must extend beyond the intellectual to include not only socially responsible attitudes but also thoughtful and appropriate action. An explicit expectation of the PYP is that successful inquiry will lead to responsible action, initiated by the student as a result of the learning process. This action will extend the student's learning, or it may have a wider social impact, and will clearly look different within each age range. PYP schools can and should meet the challenge of offering all learners the opportunity and the power to choose to act; to decide on their actions; and to reflect on these actions in order to make a difference in and to the world (see figure 10).

The problems inherent in advocating action are recognized, particularly the role of the teacher in creating opportunities that will lend themselves to the possibilities of student-initiated action. Action should be seen as a voluntary demonstration of a student's empowerment in the context of the expectations laid down in the programme. Voluntary action must remain precisely this if we truly believe in the values we advocate. Furthermore, we must remember that today's complex issues do not often suggest simple or self-evident solutions, and that inaction is also a legitimate choice; indeed, sometimes, inaction may be the best choice.

In the PYP, it is believed that every student, every year, has the right and should have the opportunity to be involved in such action. This action may be taken by an individual student or by a group of students working collaboratively. In order to make the action component of the curriculum as powerful as possible in terms of student learning, the PYP advocates a cycle of involvement that provides students with opportunities to engage in purposeful and beneficial action.

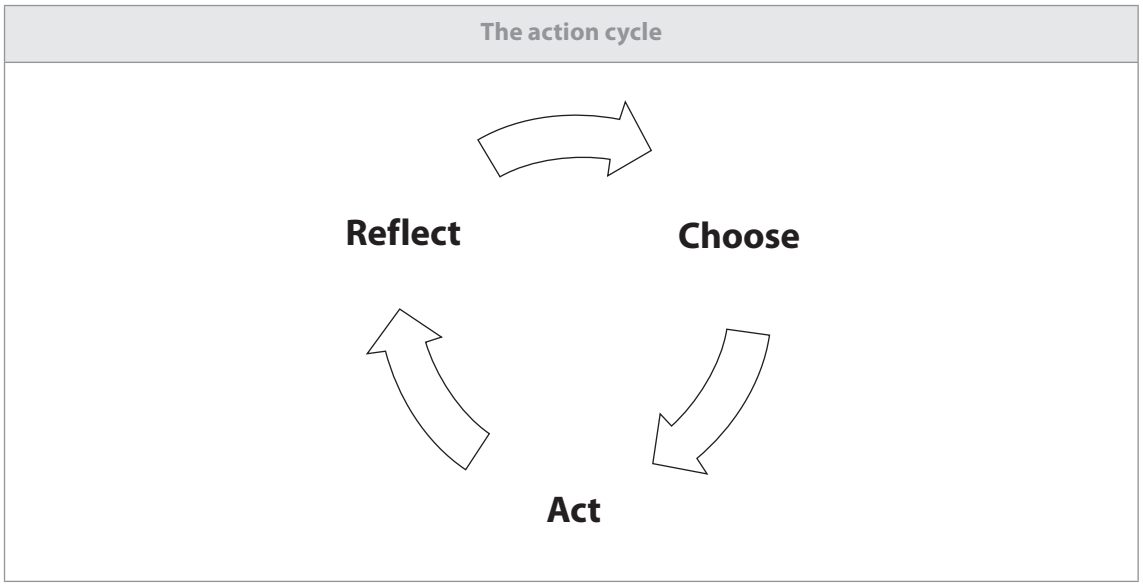

Figure 10

Action as service

The action component of the PYP can involve service in the widest sense of the word: service to fellow students, and to the larger community, both in and outside the school. Through such service, students are able to grow both personally and socially, developing skills such as cooperation, problem solving, conflict resolution, and creative and critical thinking. Moreover, these actions are ways in which the students exhibit their commitment to the attributes of the learner profile and to the attitudes that we seek to engender within the PYP classroom. In fact, the actions that the students choose to take as a result of the learning may be considered the most significant **summative assessment** of the efficacy of the programme.

Is it possible for students to identify appropriate action in which to engage?

In the PYP it is believed that not only is it possible for students to identify appropriate action, but also that teachers have a responsibility to enable them to choose their action carefully, to facilitate this action, and to encourage them to reflect on the action they undertake. This is viewed as an important part of students' active participation in their own learning.

Effective action does not need to be grandiose. On the contrary, it begins at the most immediate and basic level: with the self; within the family; within the classroom, the hallways and the playground. Even very young children can have strong feelings about fairness and justice, and teachers can facilitate positive expressions of these opinions. Effective action can be a demonstration of a sense of responsibility and respect for self, others and the environment.

Guidelines for implementation

Effective action:

- should be modelled by the adults in the school community—the action in which schools may engage will be based on the needs of the school community and the local community
- should be voluntary and involve students in exercising their own initiative
- is best grounded in the students' concrete experiences
- is most beneficial to the students when they are able to witness the outcomes

- usually begins in a small way and arises from genuine concern and commitment
- should include anticipation of consequences, and accepting of responsibility
- may require appropriate adult support in order to facilitate students' efforts and to provide them with alternatives and choices.

The action of fund-raising, either modelled by adults or initiated by students, is common in schools. Although the outcome of the fund-raising is worthy, for students whose participation is limited to the giving of money, it may not require much in the way of personal commitment or reflection. It is intended that the person taking the action will grow from the experience, and that the process of taking action or not will contribute to each student establishing a personal set of values.

Action as a result of the learning may not be witnessed by the teacher and often happens beyond the classroom (see figure 11).

Action beyond the classroom	
A parent reports to a teacher that her 4-year-old child has taken action at home, after having been on a school excursion to a recycling station/sewage treatment plant/centre.	
Parent	On your trip did the children learn about water conservation?
Teacher	It was one component of our investigations. Why do you ask?
Parent	Because during the weekend I was starting the shower for my son. He ran out of the room and came back with a bucket, and put it in the shower. When I asked him what he was doing, he replied: "I'm catching the water that is not hot enough yet for my shower, so I can save it and give the garden a drink after my shower."
Teacher	That's really interesting. He is taking action as a result of what he learned. Please let me know if this continues and if you notice anything else.

Figure 11

How best will we learn? The taught curriculum

What are the connections between the written curriculum and classroom practice—the taught curriculum?

Those learning about the PYP sometimes ask "Is it a curriculum or an approach?" The answer is "both". The PYP curriculum is defined broadly to include an approach to teaching and learning, in recognition of the fact that, in practice, the two are inextricably linked. The taught curriculum is the written curriculum in action.

The PYP developers have set out to strengthen these links by developing a curriculum in which classroom practice, the taught curriculum, is a direct reflection of the written curriculum. Therefore, in the written curriculum the essential elements of learning—knowledge, concepts, skills, attitudes and action—are identified. It is recognized that these elements are not completely separable—in the course of the learning process they blend. It is suggested that they are synthesized in three main ways:

- through the learner profile, which is supported by a curriculum framework based on the five essential elements
- through the exploration of conceptually based central ideas, linked to the transdisciplinary themes, which support and are supported by the other four essential elements
- through the collaborative planning process, which may involve input from students, that considers all three components of the PYP curriculum model—written, taught, assessed—in an iterative manner.

A culture of collaboration is required for the PYP to flourish within a school. This is most clearly reflected in the collaborative planning process that focuses on using the written curriculum to suggest central ideas that are themselves conceptually based. These central ideas may be selected to enhance each student's understanding of issues of global significance, as expressed through the transdisciplinary themes. However, whether teaching goes on within or outside the programme of inquiry, it should be about students' understanding of a central idea, wherever this is possible and reasonable. This defining of a central idea and the structuring of inquiry to support its understanding is one of the characteristics of the PYP planning process, and needs to be engaged with by all teachers in a PYP school. The teaching focuses on facilitating that inquiry in the classroom and beyond.

Why is a commitment to inquiry and the construction of meaning important?

Since its inception, the PYP has been infused with a spirit of inquiry. The ongoing implementation of the PYP is framed by means of questions such as "What do we want the students to understand and be able to do?" In seeking to answer that question, there is a commitment to refining what is significant and relevant, and to quality rather than quantity. It is believed in the PYP that meaning and understanding are undermined by an emphasis on coverage; and that students will become more enduringly skillful when the learning is authentic and in context. The curriculum in a PYP school should emphasize the active construction of meaning so that students' learning will be purposeful.

An extensive study of the literature, when combined with practical experience, has led the PYP to the position it now holds, which is one of commitment to structured, purposeful inquiry that engages students actively in their own learning. In the PYP it is believed that this is the way in which students learn best—that students should be invited to investigate significant issues by formulating their own questions, designing their own inquiries, assessing the various means available to support their inquiries, and proceeding with research, experimentation, observation and analysis that will help them in finding their own responses to the issues. The starting point is students' current understanding, and the goal is the active construction of meaning by building connections between that understanding and new information and experience, derived from the inquiry into new content.

Inquiry, as the leading pedagogical approach of the PYP, is recognized as allowing students to be actively involved in their own learning and to take responsibility for that learning. Inquiry allows each student's understanding of the world to develop in a manner and at a rate that is unique to that student.

It is recognized that there is a role for drill and practice in the classroom. Yet it is felt that teaching to the fullest extent possible about central ideas that are concept based leads to the most substantial and enduring learning.

As discussed earlier, the intention of the PYP is to support students' efforts to construct meaning from the world around them by drawing on their prior knowledge, by providing provocation through new experiences, and by providing time and opportunity for reflection and consolidation. This constructivist approach respects the students' developing ideas and understandings of the social and natural world; it continually stimulates students' revision and refinement of their models of how the world works. It implies a pedagogy that is significantly, but not necessarily completely, dependent on students' inquiry, where the planning incorporates a range of experiences that acknowledges the diversity of students' prior knowledge.

What does inquiry look like?

Inquiry, interpreted in the broadest sense, is the process initiated by the students or the teacher that moves the students from their current level of understanding to a new and deeper level of understanding. This can mean:

- exploring, wondering and questioning
- experimenting and playing with possibilities
- making connections between previous learning and current learning
- making predictions and acting purposefully to see what happens
- collecting data and reporting findings
- clarifying existing ideas and reappraising perceptions of events
- deepening understanding through the application of a concept
- making and testing theories
- researching and seeking information
- taking and defending a position
- solving problems in a variety of ways.

Inquiry involves an active engagement with the environment in an effort to make sense of the world, and consequent reflection on the connections between the experiences encountered and the information gathered. Inquiry involves the synthesis, analysis and manipulation of knowledge, whether through play or through more formally structured learning throughout the PYP.

In the PYP, the lively, animated process of inquiry appears differently within different age ranges. The developmental range evident in a group of 5 year olds can often be from 3 to 8 years. This demands that the teacher be a thoughtful participant in, and monitor of, the ongoing exploration and investigations that the students engage in or initiate. In particular, the teachers of the younger students need to be mindful of the role of the learning environment when presenting provocations to the students, for them to wonder at, and be curious about, and to stimulate purposeful play.

The PYP should be put into practice in developmentally appropriate ways. Practices are developmentally appropriate when the knowledge that may be constructed from them is related to the students' first-hand experience. This does not mean that young students do not acquire knowledge from, for example, stories, books and graphics/visuals. Nevertheless, the extent to which they acquire knowledge is dependent on whether young students can connect the new information to the knowledge they already possess and to the signs and symbols they already understand. It is important to recognize that students' learning may vary from developmental expectations.

Many different forms of inquiry are recognized, based on students' genuine curiosity and on their wanting and needing to know more about the world. It is most successful when students' questions and inquiries are genuine/honest and have real significance in moving them in a substantial way to new levels of knowledge and understanding. The most insightful inquiries, ones most likely to move the students' understanding further, come from existing knowledge. The structure of the learning environments, including the home, the classroom, the school and the community, and the behaviour modelled by others in that environment, particularly by the parent and the teacher, will lay down the knowledge foundation that will nurture meaningful participation and inquiry on the part of the students.

An explicit expectation of the PYP is that successful inquiry will lead to responsible action initiated by the students as a result of the learning process. This action may extend the students' learning, or it may have a wider social impact. Both inquiry and action will clearly look different within each age range and from one age range to the next.

How do we plan for this kind of learning?

Most curriculum guides provide the basis for planning, usually in the form of a list of learning objectives. This list provides a document **from** which to plan. In the PYP, to support teachers who are implementing the programme, the link between the written, the taught and the assessed curriculums has been strengthened. Consequently, in the PYP a document **with** which to plan is provided. This document, the PYP planner (see figure 13), is:

- designed to be used collaboratively
- structured around a central idea and lines of inquiry.

The "bubble" planner (see figure 14), includes stage-by-stage guidelines to inform the use of the planner.

How do we plan for assessment?

In the earliest stages of curriculum planning, good assessment practice requires that teachers ensure the **summative assessment** tasks are linked to the central idea of either the transdisciplinary unit of inquiry or of any teaching outside the programme of inquiry. This summative assessment should provide varied opportunities for the students to show their conceptual understanding. With these central ideas and assessment tasks in mind, activities and resources can be selected.

Teachers should develop ways to assess prior knowledge and skills in order to plan the inquiry. Teachers should also consider ways of assessing students' learning in the context of the lines of inquiry that support the inquiry into the central idea **(formative assessments)**.

Continuous assessment provides insights into students' understanding, knowledge, skills and attitudes. It is also a means of exploring the learning styles and individual differences of the students in order to differentiate instruction.

When planning for assessment, teachers should think like assessors rather than activity designers, clearly setting the criteria that distinguish students' understanding of the central idea or learning objective. The teacher must constantly look for evidence that meets the criteria. Students should be involved whenever possible in the planning of an assessment task.

In planning for assessment, it is important to ask these questions:

- What is the function of the assessment?
- What central idea or learning objectives are being assessed?
- What evidence of the learning will be looked for?
- How can the evidence be collected?
- What experiences are being provided/supported to help the students be successful with the assessment?
- Will the assessment task demonstrate understanding?
- Is the assessment reliable enough to allow sound conclusions to be drawn?
- How will the assessment data be analysed and recorded?
- How and when will feedback be given?

Using the planner

To ensure the coherence of the learning from the students' points of view, it is essential that all teachers in a PYP school see themselves as PYP teachers, and are fully committed to and engaged with the philosophy and practices of the programme. Within each school community, the approach to the implementation of the programme needs to be holistic, not fragmented by disciplinary teaching.

The version of the planner included in this edition of *Making the PYP happen: A curriculum framework for international primary education* has been developed for use by all teachers whose teaching is organized around the exploration of a central idea. This includes the classroom teachers who are usually with their students for most of the time, but also any single-subject teachers who usually spend less time with the students.

The PYP programme of inquiry is defined by the six transdisciplinary themes that are considered worthy of inquiry regardless of the age of the student. These are: *Who we are*, *Where we are in place and time*, *How we express ourselves*, *How the world works*, *How we organize ourselves*, and *Sharing the planet*. Each theme is explored in a unit of inquiry that is planned and documented on a PYP planner.

Six units of inquiry—one for each transdisciplinary theme—should be addressed each year, except in the case of the early years. Exceptionally, the 3–5 year olds are required to complete at least four units of inquiry each year. Two transdisciplinary themes are considered fundamentally relevant to all young students and must be included each year: these are *Who we are* and *How we express ourselves*. Please note that the 5–6 year olds are required to do six units.

Due to the nature of development and learning for the 3–6 year olds, some of the units may be designed to be ongoing throughout the school year. In addition to these, any one unit may be revisited during the year, as shown in figure 12. However, it would not be appropriate to consolidate several units onto one planner; each unit must be documented on a separate planner.

Time allocation for the units of inquiry for 3–6 year olds

The length of the unit, which may be from several weeks (c) to one year (a), is at the discretion of the teacher.

(a) A unit may be developed continually throughout the year.

(b) A unit may be revisited once or on more than one occasion during the year.

(c) A unit may have a discrete beginning and a discrete end, during the course of the year, and last for several weeks.

(d) Another unit may be developed at the same time as an ongoing unit, for example, (a) and (c) or any other combination.

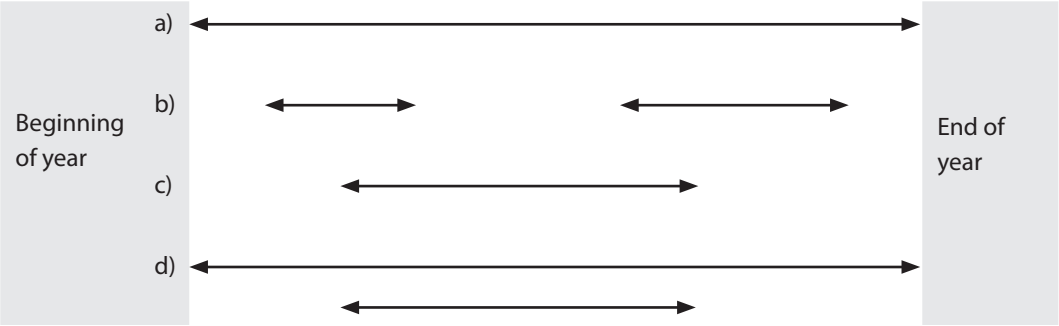

Figure 12

The teacher may exercise considerable freedom in structuring an appropriate time frame for the development of the units. It is important to remember and take into consideration that the responsibility for developing and teaching the units that address the required themes is not only that of the classroom teacher; it should be shared with all appropriate single-subject teachers.

The PYP planner

Planning the inquiry

1. What is our purpose?

To inquire into the following:

- **transdisciplinary theme**

- **central idea**

Summative assessment task(s):

What are the possible ways of assessing students' understanding of the central idea? What evidence, including student-initiated actions, will we look for?

Class/grade: Age group:

School: School code:

Title:

Teacher(s):

Date:

Proposed duration: number of hours over number of weeks

PYP planner

2. What do we want to learn?

What are the key concepts (form, function, causation, change, connection, perspective, responsibility, reflection) to be emphasized within this inquiry?

What lines of inquiry will define the scope of the inquiry into the central idea?

-
-
-

What teacher questions/provocations will drive these inquiries?

Figure 13

Planning the inquiry

3. How might we know what we have learned?

This column should be used in conjunction with "How best might we learn?"

What are the possible ways of assessing students' prior knowledge and skills? What evidence will we look for?

What are the possible ways of assessing student learning in the context of the lines of inquiry? What evidence will we look for?

4. How best might we learn?

What are the learning experiences suggested by the teacher and/or students to encourage the students to engage with the inquiries and address the driving questions?

What opportunities will occur for transdisciplinary skills development and for the development of the attributes of the learner profile?

5. What resources need to be gathered?

What people, places, audio-visual materials, related literature, music, art, computer software, etc, will be available?

How will the classroom environment, local environment, and/or the community be used to facilitate the inquiry?

Figure 13 (continued)

Reflecting on the inquiry

6. To what extent did we achieve our purpose?	7. To what extent did we include the elements of the PYP?
Assess the outcome of the inquiry by providing evidence of students' understanding of the central idea. The reflections of all teachers involved in the planning and teaching of the inquiry should be included. How you could improve on the assessment task(s) so that you would have a more accurate picture of each student's understanding of the central idea. What was the evidence that connections were made between the central idea and the transdisciplinary theme?	What were the learning experiences that enabled students to: • develop an understanding of the concepts identified in "What do we want to learn?" • demonstrate the learning and application of particular transdisciplinary skills? • develop particular attributes of the learner profile and/or attitudes? In each case, explain your selection.

Figure 13 (continued)

Reflecting on the inquiry

8. What student-initiated inquiries arose from the learning?	9. Teacher notes
Record a range of student-initiated inquiries and student questions and highlight any that were incorporated into the teaching and learning. *At this point teachers should go back to box 2 "What do we want to learn?" and highlight the teacher questions/provocations that were most effective in driving the inquiries.* **What student-initiated actions arose from the learning?** Record student-initiated actions taken by individuals or groups showing their ability to reflect, to choose and to act.	

Figure 13 (continued)

The PYP bubble planner

Planning the inquiry

1. What is our purpose?

To inquire into the following:

- **transdisciplinary theme**
- **central idea**

Early in the collaborative planning process the definition of the **transdisciplinary theme** should be revisited to ensure that appropriate connections are made between it and the central idea.

The **central idea** should be written in one sentence that expresses concisely an enduring understanding. It should be substantial enough to generate in-depth inquiries, be concept-driven and promote the ability to think critically. It should challenge and extend students' prior knowledge, and should be a means of extending students' understanding of the **transdisciplinary theme**.

Summative assessment task(s):

What are the possible ways of assessing students' understanding of the central idea? What evidence, including student-initiated actions, will we look for?

These questions should be addressed immediately after formulating the central idea. If there is no effective way that students can demonstrate their understanding of the central idea, the central idea will need to be revised so that students' understanding of it can be shown. The articulation between the central idea and the summative assessment task(s) needs to be resolved before further planning takes place.

Teachers need to be mindful of the diverse forms of evidence that may indicate understanding of the central idea. Student-initiated action may well be one form of this evidence. Teachers may find it helpful to anticipate the possible student-initiated actions that could take place.

Class/grade: Age group:

School: School code:

Title:

Teacher(s):

Date:

Proposed duration: number of hours over number of weeks

PYP planner

2. What do we want to learn?

What are the key concepts (form, function, causation, change, connection, perspective, responsibility, reflection) to be emphasized within this inquiry?

After discussing the relevance of the key concepts to the central idea, no more than three of the key concepts should be selected to focus on in this inquiry. Related concepts, which may be subject-specific but related to the key concepts, could also be listed here.

What lines of inquiry will define the scope of the inquiry into the central idea?

-
-
-

There should be three or four lines of inquiry that clarify the central idea and define the scope of the inquiry. These contributing aspects of the central idea extend the inquiry, focus student research, and deepen students' understanding. Connections should be made as appropriate between the lines of inquiry, as well as with the central idea.

What teacher questions/provocations will drive these inquiries?

The teachers have the responsibility of framing the inquiries at the beginning of the unit through the questions they ask and/or the provocations they provide (for example, rearranging the learning environment). This is also the opportunity for them to model explicitly the asking of open-ended, driving questions that will promote conceptual development.

As the collaborative planning process is ongoing, the planner will be revisited during the inquiry.

Figure 14

Planning the inquiry

3. How might we know what we have learned?

This column should be used in conjunction with "How best might we learn?"

What are the possible ways of assessing students' prior knowledge and skills? What evidence will we look for?

Students should be aware of the criteria used to assess their performance and regular feedback should describe the progress of students' learning and identify areas for growth. Students should be encouraged to be reflective learners through self- and peer-assessment.

Evidence of each student's learning must be collected and presented in a manner that allows the student to reflect on the learning and describe his/her progress to others. Records should allow teachers and students to see progress in the development of knowledge, skills and understandings.

Teachers should bear in mind that a well-designed assessment task becomes, in and of itself, a learning experience because it provides opportunities to reinforce or extend the learning.

What are the possible ways of assessing student learning in the context of the lines of inquiry? What evidence will we look for?

4. How best might we learn?

What are the learning experiences suggested by the teacher and/or students to encourage the students to engage with the inquiries and address the driving questions?

Suggestions of activities from students may be in response to their own questions, as well as those posed by the teacher. Learning experiences should also be designed so that students will have the opportunity to develop an understanding of, and make connections between, the key concepts.

Teachers should bear in mind that a well-designed learning experience will provide data on students' knowledge, skills and understanding, and is consequently a vehicle for formative or summative assessment.

What opportunities will occur for transdisciplinary skills development and for the development of the attributes of the learner profile?

When providing students with the opportunity to develop transdisciplinary skills, the attributes of the learner profile and/or the attitudes, teachers need to be mindful of the difference between opportunities that arise authentically from the learning, as opposed to explicitly targeted teaching opportunities.

5. What resources need to be gathered?

What people, places, audio-visual materials, related literature, music, art, computer software, etc, will be available?

How will the classroom environment, local environment, and/or the community be used to facilitate the inquiry?

List available resources that you will use to support the inquiry. Discussions need to take place between the media centre staff, including the librarian and ICT support, and the classroom teachers to identify their roles both in the planning of the inquiry and during the extended inquiry itself. Whether or not the resources selected were adequate could be commented on in the teacher notes section.

Figure 14 (continued)

Reflecting on the inquiry

6. To what extent did we achieve our purpose?

Assess the outcome of the inquiry by providing evidence of students' understanding of the central idea. The reflections of all teachers involved in the planning and teaching of the inquiry should be included.

It is understood that evidence of student learning will be found in student work, teachers' anecdotal records and classroom collections such as portfolios. One or two examples should be described here or attached to the planner.

How you could improve on the assessment task(s) so that you would have a more accurate picture of each student's understanding of the central idea.

This reflection not only gives the teachers the opportunity to improve the assessments, but also to modify and strengthen the central idea.

What was the evidence that connections were made between the central idea and the transdisciplinary theme?

Teachers should include clear and detailed examples of classroom discussions, comments or student work that demonstrate connections made between the central idea and the transdisciplinary theme.

7. To what extent did we include the elements of the PYP?

What were the learning experiences that enabled students to:

- develop an understanding of the concepts identified in "What do we want to learn?"
- demonstrate the learning and application of particular transdisciplinary skills?
- develop particular attributes of the learner profile and/or attitudes?

In each case, explain your selection.

Learning experiences that were particularly engaging, relevant, challenging and significant should be noted.

It is recognized that this planning tool cannot record all of the learning that takes place in a PYP classroom. Teachers should use their anecdotal records in order to more fully record the development of the attributes listed in the learner profile. This development is complemented and supported by the development of the PYP attitudes and teachers may also discuss them here.

Figure 14 (continued)

Reflecting on the inquiry

8. What student-initiated inquiries arose from the learning?

Record a range of student-initiated inquiries and student questions and highlight any that were incorporated into the teaching and learning.

A range of student questions and wonderings should be recorded as evidence of the range of conceptual understanding in the group.

Some student-initiated inquiries will be particularly influential in determining the nature of the inquiry and should be highlighted. These highlighted examples may influence and inform planning when the inquiry is next visited.

At this point teachers should go back to box 2 "What do we want to learn?" and highlight the teacher questions/provocations that were most effective in driving the inquiries.

What student-initiated actions arose from the learning?

Record student-initiated actions taken by individuals or groups showing their ability to reflect, to choose and to act.

As the action component may develop spontaneously during the course of the inquiry, or even after the inquiry has been completed, this section may be revisited both during and after the inquiry.

Not every inquiry will necessarily have a student-initiated action component.

9. Teacher notes

Further reflections and connections to other central ideas, transdisciplinary themes or single-subject areas should be included where appropriate.

Figure 14 (continued)

Evaluating a written planner for an inquiry

After the planning process is completed, teachers should reflect on how effective their planning is. Questions to be considered for evaluating the quality of the planning documented on the planner are as follows.

Purpose

- Is the central idea clearly stated?
- Have appropriate connections been made between the central idea and the transdisciplinary theme?
- Do the teacher questions and provocations reflect the purpose?
- Are the teacher questions clear, open-ended and precise?
- Are the lines of inquiry appropriate to the development level and interests of the students?
- Is there a direct link between the concept-based questions and the activities?
- Does the inquiry provide opportunities for:
  - exploring significant knowledge
  - understanding key concepts and related concepts
  - acquiring and applying relevant skills
  - developing responsible attitudes
  - reflection and taking action?
- Do the lines of inquiry and learning experiences promote international-mindedness?

Learning experiences

- Do the learning experiences reflect a variety of appropriate teaching and learning strategies?
- Does the availability and range of resources support inquiry for all students?
- Will the students be actively engaged, and challenged?
- Is there room for student-initiated inquiry?

Assessment

- Does the summative assessment link to the central idea?
- Do the assessment strategies and tools allow for individual differences?
- Are the criteria for success in this inquiry clearly identified for both students and teachers?
- Does the assessment allow the teacher to give feedback to the students and parents?

Good PYP practice

A PYP classroom can only be fully effective in the context of a PYP school. In a PYP school, all constituents are committed to learning and to developing international-mindedness. Adults and students are encouraged to identify problems and seek solutions in the pursuit of continuous improvement towards common goals. A PYP school is infused with a sense of purpose and a spirit of inquiry. Within this setting, each classroom operates as a microcosm of the larger institution.

The classroom is a place of variety and balance. Balance is seen in the attention given both to the pursuit of understanding and to the acquisition of knowledge and essential skills. Variety is there in the range of teaching and assessment strategies and resources used by teachers to meet the needs of each student; and also in the levels of performance the teacher expects to see within the class, and even from one student over time.

Students are actively engaged in planning and assessing their own learning. They are supportive of each other and learning to establish their personal set of beliefs and values. They recognize both their right to an education and their role in achieving that. They are empowered to do their best, for themselves, and in order to contribute to the learning and well-being of others.

A PYP classroom is a lively place, characterized by collaborative and purposeful activity. It is also a reflective place, where thoughtful consideration of issues, problems and successes is valued highly.

Above all, and in summary, a PYP classroom is an intelligent place. It is a place in which the easy option is seldom sought and where the expectations are high. It is an environment in which learning knows no limits.

The role of the adult

The teacher must be familiar with child development and learning, be responsive to the needs and interests of the individual student, and be aware of the cultural and social contexts in which the student lives and learns. The role of the teacher is to facilitate connections between the student's prior knowledge and the knowledge available through new experiences. This is best done with the support of the parents, because it is the student's environment—the home, the school and the community—that will shape the student's cognitive experience.

The teacher needs to provide a secure learning environment in which the individual student is valued and respected, so that the relationships students establish with each other and with adults, which are of central importance to development and learning, will flourish. The student is best served when the relationships between the teacher and the parent, and between the school and the home, are reciprocal and supportive. In a PYP classroom, parents are welcomed as partners, with a clear role to play in supporting the school and their own children. They are informed and involved.

The range of development and learning demonstrated by each member of a group of students will inform which practices the teacher will need to implement to meet the needs of both the group and the individual. The PYP suggests that the teacher's role in this process is to create an educational environment that encourages students to take responsibility, to the greatest possible extent, for their own learning. This means that resources must be provided for each student to become involved in self-initiated inquiry, in a manner appropriate to each student's development and modalities of learning.

The PYP classroom is a dynamic learning environment, with the students moving from group work to individual work in response to their needs and the needs of the inquiries to which they have committed. The students will change roles, working as a leader, a partner, or a member of a larger group.

In the PYP classroom, the teacher facilitates the process of students becoming initiators rather than followers by creating opportunities for and supporting student-initiated inquiries; by asking carefully thought-out, open-ended questions; and by encouraging students to ask questions of each other as well as of the teacher. It goes without saying that the teacher must also value and model inquiry.

Structuring the environment for students

The school environment needs to have a range of clearly defined areas to encourage inquiry, investigation, exploration and play, both in and out of doors. These may include spaces for reading, writing, art, construction, imaginative play and science, with a wide variety of appropriate resources in each. Particularly for young students, interactions in and with these spaces stimulate them to become active learners. They need extended periods of time and as much space as possible to explore, investigate and play with a variety of materials in order to learn about themselves, other people and the world around them. Teachers should structure dynamic learning environments to provide ongoing opportunities for students to develop planned and spontaneous inquiries by:

- making choices and decisions
- using materials in flexible and imaginative ways
- initiating inquiry and asking questions
- working collaboratively with others
- sustaining their interests and extending their knowledge
- developing understanding.

The role of ICT

In the PYP, the ever-increasing impact of information and communication technologies (ICT) on teaching and learning is recognized. It is recommended that all staff be trained to learn how to use any technologies provided for them by the school, and that the use of the available technologies be integrated into student inquiries.

Many students will bring previous experience and knowledge that can be drawn upon to enhance the learning of others, including that of the teacher. In fact, it is in this area that a PYP classroom most often resembles a community of learners.

ICT provides opportunities for the enhancement of learning, and may significantly support students in their inquiries, and in developing their conceptual understanding. It is best considered as a tool for learning, albeit with its own set of skills, as opposed to an additional subject area. ICT skills should be developed and learned in order to support the needs of individual learners in their inquiries.

The use of ICT:

- can document the learning, making it available to all parties
- can provide opportunities for rapid feedback and reflection
- can provide opportunities to enhance authentic learning
- can provide access to a broad range of sources of information
- can provide students with a range of tools to store, organize and present their learning
- encourages and allows for communication with a wide-ranging audience.

A PYP school community should collaboratively identify and agree on the need for, and aims of, the use of ICT. ICT tools should be used critically, with integrity, and there should be specific attention given to the validity and reliability of information gained through their use.

How will we know what we have learned? The assessed curriculum

What is the PYP perspective on assessment?

Assessment is integral to all teaching and learning. It is central to the PYP goal of thoughtfully and effectively guiding students through the five essential elements of learning: the acquisition of knowledge, the understanding of concepts, the mastering of skills, the development of attitudes and the decision to take action. The prime objective of assessment in the PYP is to provide feedback on the learning process. All PYP schools are expected to develop assessment procedures and methods of reporting that reflect the philosophy and objectives of the programme.

Assessment involves the gathering and analysis of information about student performance and is designed to inform practice. It identifies what students know, understand, can do, and feel at different stages in the learning process. Students and teachers should be actively engaged in assessing the students' progress as part of the development of their wider critical-thinking and self-assessment skills.

Teachers need to be mindful of the particular learning outcomes on which they intend to report, prior to selecting or designing the method of assessment. They need to employ techniques for assessing students' work that take into account the diverse, complicated and sophisticated ways that individual students use to understand experience. Additionally, the PYP stresses the importance of both student and teacher self-assessment and reflection.

Everyone concerned with assessment, including students, teachers, parents and administrators, should have a clear understanding of the reason for the assessment, what is being assessed, the criteria for success, and the method by which the assessment is made. The entire school community should also be concerned with evaluating the efficacy of the programme.

Programme **evaluation** contributes to the continuing improvement of the overall programme. Student performance is assessed in accordance with the programme standards and practices, the overall learning outcomes and the subject-specific overall expectations. It also provides information used to inform members of the school community and others of the success of the programme.

The PYP approach to assessment recognizes the importance of assessing the process of inquiry as well as the product(s) of inquiry, and aims to integrate and support both. The teacher is expected to record the detail of inquiries initiated by students in order to look for an increase in the substance and depth of the inquiry. The teacher needs to consider:

- if the nature of students' inquiry develops over time—if they are asking questions of more depth, that are likely to enhance their learning substantially
- if students are becoming aware that real problems require solutions based on the integration of knowledge that spans and connects many areas
- if students are demonstrating mastery of skills
- if students are accumulating a comprehensive knowledge base and can apply their understanding to further their inquiries successfully
- if students are demonstrating both independence and an ability to work collaboratively.

The assessment component in the school's curriculum can itself be subdivided into three closely related areas.

- **Assessing**—how we discover what the students know and have learned.
- **Recording**—how we choose to collect and analyse data.
- **Reporting**—how we choose to communicate information.

Assessing: how do we discover what students have learned?

Student learning is promoted through planning and refining the teaching and learning process to meet individual or group needs. Assessing the students' prior knowledge and experience as well as monitoring their achievement during the teaching period will enable teachers to plan and refine their teaching accordingly. Teachers should bear in mind that a well-designed learning experience will provide data on students' knowledge, skills and conceptual understanding, and is consequently a vehicle for summative or formative assessment.

Summative assessment aims to give teachers and students a clear insight into students' understanding. Summative assessment is the culmination of the teaching and learning process, and gives the students opportunities to demonstrate what has been learned. It can assess several elements simultaneously: it informs and improves student learning and the teaching process; it measures understanding of the central idea, and prompts students towards action.

Formative assessment provides information that is used in order to plan the next stage in learning. It is interwoven with learning, and helps teachers and students to find out what the students already know and can do. Formative assessment and teaching are directly linked and function purposefully together. Formative assessment aims to promote learning by giving regular and frequent feedback. This helps learners to improve knowledge and understanding, to foster enthusiasm for learning, to engage in thoughtful reflection, to develop the capacity for self-assessment, and to recognize the criteria for success. There is evidence that increased use of formative assessment particularly helps those students who are low achievers to make significant improvements in their understanding.

Assessment in the classroom will include:

- using representative examples of students' work or performance to provide information about student learning
- collecting evidence of students' understanding and thinking
- documenting learning processes of groups and individuals
- engaging students in reflecting on their learning
- students assessing work produced by themselves and by others
- developing clear rubrics
- identifying exemplar student work
- keeping records of test/task results.

After any assessment is complete, it is important to ask further questions such as the following.

- Have the tasks provided ample information to allow a judgment to be made about whether the purposes or objectives have been met?
- What does the students' performance reveal about their level of understanding?
- Have any unexpected results occurred?
- What changes should be made in the assessment procedure?
- How should the teaching and learning process be modified as a result of the assessment?

Effective assessments

The following criteria for effective assessments are applicable to both formative and summative assessment.

Effective assessments allow students to:

- share their learning and understanding with others
- demonstrate a range of knowledge, conceptual understanding and skills
- use a variety of learning styles, multiple intelligences and abilities to express their understanding
- know and understand in advance the criteria for producing a quality product or performance
- participate in reflection, self- and peer-assessment
- base their learning on real-life experiences that can lead to further inquiries
- express different points of view and interpretations
- analyse their learning and understand what needs to be improved.

Effective assessments allow teachers to:

- inform every stage of the teaching and learning process
- plan in response to student and teacher inquiries
- develop criteria for producing a quality product or performance
- gather evidence from which sound conclusions can be drawn
- provide evidence that can be effectively reported and understood by the whole school community
- collaboratively review and reflect on student performance and progress
- take into account a variety of learning styles, multiple intelligences and abilities including different cultural contexts
- use scoring that is both **analytical** (separate scores for different aspects of the work) and **holistic** (single scores).

Effective assessments allow parents to:

- see evidence of student learning and development
- develop an understanding of the student's progress
- provide opportunities to support and celebrate student learning.

Further considerations for assessing the learning of young students

The assessment of the development and learning of young students is an essential component of the curriculum, and helps to inform continued development, learning and teaching. Students should be observed in a variety of situations, and a wide range of assessment strategies should be implemented. The teacher observes the young student in order to:

- build up a clear picture of the student and his or her interests
- identify what and how the student is thinking and learning
- assess the effectiveness of the environment on the student's learning
- extend the student's learning.

When observing, the teacher should record what the students say. By listening carefully to the dialogue between students, especially in dramatic play, the teacher can learn about their current interests, knowledge base, level of involvement and social skills. The teacher should share these observations with the students, with colleagues and with parents to know better the inner world of the student, analyse the interactions within a group, discover the student's strengths and difficulties, and reflect on the effectiveness of the practices used to implement the programme of inquiry and other classroom experiences.

It is important to identify the needs of each student and to view learning as a continuum, with each student achieving developmental milestones in different but relevant ways. Through listening and observing, areas of learning that the students particularly enjoy can be identified, and stimulating experiences can be planned to consolidate or extend the learning further.

Recording: how do we collect and analyse the data?

Assessment strategies and tools form the basis of a comprehensive approach to assessment and represent the school's answer to the question "How will we know what we have learned?"

The strategies are the methods or approaches that teachers use when gathering information about a student's learning. Teachers record this information using a variety of tools, which are the instruments used to collect data.

When choosing appropriate strategies, it is important to take into consideration which tools are most applicable and relevant to that strategy. This helps to ensure that an effective assessment of the learning experience takes place. A variety of strategies and tools should be used (see figure 15).

Assessment strategies and tools					
Assessment tools / Assessment strategies	Rubrics	Exemplars	Checklists	Anecdotal records	Continuums
Observations	✓		✓	✓	✓
Performance assessments	✓	✓		✓	✓
Process-focused assessments	✓		✓	✓	✓
Selected responses		✓	✓		✓
Open-ended tasks	✓	✓		✓	✓

Figure 15

Strategies

The strategies in figure 16 have been identified as central to the assessment process. They cover a broad range of approaches, from the more subjective and intuitive to the more objective and scientific. It is essential that they be seen as a package since they have been selected in order to provide a range of approaches and therefore to provide a balanced view of the student.

Assessment strategies	
Observations	All students are observed often and regularly, with the teacher taking a focus varying from wide angle (for example, focusing on the whole class) to close up (for example, focusing on one student or one activity), and from non-participant (observing from without) to participant (observing from within).
Performance assessments	The assessment of goal-directed tasks with established criteria. They provide authentic and significant challenges and problems. In these tasks, there are numerous approaches to the problem and rarely only one correct response. They are usually multimodal and require the use of many skills. Audio, video and narrative records are often useful for this kind of assessment.

Figure 16

Assessment strategies	
Process-focused assessments	Students are observed often and regularly, and the observations are recorded by noting the typical as well as non-typical behaviours, collecting multiple observations to enhance reliability, and synthesizing evidence from different contexts to increase validity. A system of note taking and record keeping is created that minimizes writing and recording time. Checklists, inventories and narrative descriptions (such as learning logs) are common methods of collecting observations.
Selected responses	Single occasion, one-dimensional exercises. Tests and quizzes are the most familiar examples of this form of assessment.
Open-ended tasks	Situations in which students are presented with a stimulus and asked to communicate an original response. The answer might be a brief written answer, a drawing, a diagram or a solution. The work, with the assessment criteria attached, could be included in a portfolio.

Figure 16 (continued)

Tools

The assessment strategies listed in figure 16 may be put into practice using the assessment tools in figure 17.

Assessment tools	
Rubrics	An established set of criteria for rating students in all areas. The descriptors tell the assessor what characteristics or signs to look for in students' work and then how to rate that work on a predetermined scale. Rubrics can be developed by students as well as by teachers.
Exemplars	Samples of students' work that serve as concrete standards against which other samples are judged. Generally there is one benchmark for each achievement level in a scoring rubric. Each school is encouraged to set benchmarks that are appropriate and usable within their particular school context.
Checklists	These are lists of information, data, attributes or elements that should be present. A mark scheme is a type of checklist.
Anecdotal records	Anecdotal records are brief written notes based on observations of students. "Learning stories" are focused, extended observations that can be analysed later. These records need to be systematically compiled and organized.
Continuums	These are visual representations of developmental stages of learning. They show a progression of achievement or identify where a student is in a process.

Figure 17

These assessment tools may be used in conjunction with other forms of assessment, such as standardized tests, in order to assess both student performance and the efficacy of the programme.

The IB position on standardized achievement tests

While the IB does not administer or encourage the use of standardized achievement tests, it recognizes that there may be a local, state or national requirement concerning the use of such tests for many IB World Schools. Some other IB World Schools, not subject to these requirements, do choose to use commercially available tests in order to measure their students' performance over time, in areas defined by the test but not directly linked to the learning defined in the academic programme. When standardized achievement tests are an option, administrators and teachers should carefully consider:

- the relevance of the test to the cohort of students within the school
- the relationship between what is being tested and the school's programme
- the impact of testing on teaching and learning
- the usability of the data produced.

Documentation

The documentation of the evidence of student learning is an assessment strategy relevant to all students throughout the PYP, but may be particularly significant in the early years (3–5 years). Teachers use a range of methods to document student learning as a means of assessing student understanding. This may include, but is not limited to, videos, audio, photographs and graphic representations.

Teachers may also use written records of student conversations, comments, explanations and hypotheses as well as annotated pieces of student work that may form part of a student's portfolio.

Portfolios

Schools have a responsibility to show evidence of student learning. As an example, portfolios are one method of collecting and storing information that can be used to document and assess student progress and achievement.

A portfolio is a record of students' involvement in learning which is designed to demonstrate success, growth, higher-order thinking, creativity, assessment strategies and reflection. A portfolio is a celebration of an active mind at work. It provides a picture of each student's progress and development over a period of time both as individual and group learners. It enables students to reflect with teachers, parents and peers in order to identify their strengths and growth as well as areas for improvement, and then to set individual goals and establish teaching and learning plans.

Evidence of learning in a portfolio should be from a range of experiences and curriculum areas. The portfolio is used to show the development of knowledge, conceptual understanding, transdisciplinary skills, attitudes and the attributes of the learner profile over a period of time. It may also be used to document student action. Portfolio entries should document both the process of learning and the product, including images and evidence of students in the process of constructing meaning. It can be used as a tool for assessment and reporting purposes for students, parents, teachers and administrators.

How does it work?

Schools using portfolios will need to develop agreements for their use. Things to consider are:

- the criteria for selecting pieces of work
- who will select the pieces of work
- what will accompany the selected pieces of work (for example, self-assessment, reflections, assessment tools, teacher comments)
- how to establish what is to be included and what will be removed

- when and how portfolios are to be used (for reporting purposes, student-led conferences, parent–teacher interviews, report writing)
- the format the portfolios will take (for example, electronic, binder, folder)
- where the portfolios will be housed
- who has access to the portfolios
- who the portfolio ultimately belongs to
- how the portfolios will move with the students.

Reporting: how do we choose to communicate information about assessment?

Reporting on assessment is about communicating what students know, understand and can do. It describes the progress of the students' learning, identifies areas for growth, and contributes to the efficacy of the programme. Assessment without feedback is merely judgment; feedback is the component of assessment that lets us interpret the judgment and improve our work. Reporting is perhaps the most public aspect of a school's assessment policy, and as such needs careful consideration in order to provide clear information that is useful to students and parents. Reporting may take many forms including conferences and written reports.

Effective reporting should:

- involve parents, students and teachers as partners
- reflect what the school community values
- be comprehensive, honest, fair and credible
- be clear and understandable to all parties
- allow teachers to incorporate what they learn during the reporting process into their future teaching and assessment practice.

Schools are required to report on each student's development according to the attributes of the learner profile. However, this feedback does not need to be included on a report card, and teachers do not need to report on each attribute at the end of every reporting period. It is not appropriate to grade or score the attributes of the learner profile.

Opportunities should be provided for students to consider their progress in relation to the attributes listed in the IB learner profile in the context of student learning. Observations and anecdotal records of their own performance could be included in each student's portfolio of selected work. The student could also contribute to reporting to parents, through the report card and/or student-led conferences.

The issue is that the parents need to know about the learner profile and that the school community attaches the utmost importance to it, such that it influences the valued practices and cultural norms within the school. This is also an example of the process being more important than the product, and of the student's role in the process being strengthened and made clear.

Conferences

The purpose of conferences is to share information between teachers, students and parents. A school should determine the function of conferences in order to develop their structure, and this might include goal setting. These conferences may take a formal or informal structure.

The following structures may be used.

Teacher–student

These are designed to give students feedback so they can reflect on their work and further refine and develop their skills. It is important that these individual conferences occur frequently in order to support and encourage the student's learning and teacher planning.

Teacher–parent(s)

These are designed to give the parents information about the student's progress development and needs, and about the school's programme. Teachers should take this opportunity to gather background information, to answer the parents' questions, to address their concerns, and to help define their role in the learning process. The parents should take the opportunity to provide the teacher with the cultural context of the student's learning.

Student-led

Student-led conferences involve the student and the parent. The students are responsible for leading the conference, and also take responsibility for their learning by sharing the process with their parents. It may involve students demonstrating their understanding through a variety of different learning situations. There may be several conferences taking place simultaneously.

The conference will involve the students discussing and reflecting upon samples of work that they have previously chosen to share with their parents. These samples have been previously selected with guidance and support from the teacher, and could be from the student's portfolio. The student identifies strengths and areas for improvement. It enables parents to gain a clear insight into the kind of work their child is doing and offers an opportunity for them to discuss it with their child. The conferences must be carefully prepared, and time must be set aside for the students to practise their presentations. The format of this conference will depend on the age of the student and all of the participants must understand the format and their roles prior to the conference.

Three-way

Three-way conferences involve the student, parents and teacher. Students discuss their learning and understanding with their parents and teacher, who are responsible for supporting the student through this process. Students are responsible for reflecting upon work samples they have chosen to share, that have been previously selected with guidance and support from the teacher and could be from the student's portfolio. The student, parents and the teacher collaborate to establish and identify the student's strengths and areas for improvement. This may lead to the setting of new goals, with all determining how they can support the achievement of the goals. The teacher is an integral part of the process and takes notes of the discussion. These notes may then be used in the written report. All of the participants must understand the format and their roles prior to the conference.

The written report

Written reports are seen as a summative record for students, parents and the school itself of a student's progress. Nonetheless, the formative potential of an effective reporting procedure should not be overlooked. Reports that clearly indicate areas of strengths, areas for improvement, and where students are involved in providing input (through self-assessment), are helpful aids to a student's development.

The reporting system and procedures of a PYP school should reinforce the underlying values of the programme. Many schools will be subject to local requirements that include standardized reports or formats that may not reflect PYP objectives and assessment criteria. In such cases, schools are expected to devise additional forms of reporting that take into account the assessment model of the PYP and provide a clear indication of the student's progress with reference to the learner profile.

There are no specific formats preferred by the IB for reports, but the following points may prove useful in formulating a reporting system.

1. The learner profile is addressed.
2. The transdisciplinary units and the subject-specific teaching are included.
3. All teachers involved in the student's progress have an opportunity to comment.
4. All the essential elements of the programme are included.

Examples of schools' report card templates can be found on the OCC.

The exhibition

In the final year of the PYP, students participate in a culminating project, the PYP exhibition. This requires that each student demonstrates engagement with the five essential elements of the programme: knowledge, concepts, skills, attitudes and action. It is a transdisciplinary inquiry conducted in the spirit of personal and shared responsibility, as well as a summative assessment activity that is a celebration as students move from the PYP into the middle years of schooling. For further information and guidance on the exhibition, refer to *PYP exhibition guidelines* (2004).

The exhibition represents a significant event in the life of a PYP school and student, synthesizing the essential elements of the PYP, and sharing them with the whole school community. It is an opportunity for students to exhibit the attributes of the learner profile that have been developing throughout their engagement with the PYP.

In the students' final year of the PYP, which occurs in some schools at 10–11 years old and in others at 11–12 years old, there are five units of inquiry and the exhibition. The exhibition unit takes place under any transdisciplinary theme at the discretion of the school. Students are required to engage in a collaborative, transdisciplinary inquiry process that involves them in identifying, investigating and offering solutions to real-life issues or problems. The central idea selected must be of sufficient scope and significance to warrant a detailed investigation by all students.

The PYP exhibition has a number of key purposes including the following.

- For students to engage in an in-depth, collaborative inquiry
- To provide students with an opportunity to demonstrate independence and responsibility for their own learning
- To provide students with an opportunity to explore multiple perspectives
- For students to synthesize and apply their learning of previous years, and to reflect on their journey through the PYP
- To provide an authentic process for assessing student understanding
- To demonstrate how students can take action as a result of their learning
- To unite the students, teachers, parents and other members of the school community in a collaborative experience that incorporates the essential elements of the PYP
- To celebrate the transition of learners from primary to middle/secondary education

As the culminating PYP experience, it is required that the exhibition reflects all the major features of the programme. Therefore, it must include regular and carefully planned assessment.

This assessment should take two forms: firstly, ongoing assessment of each individual student's contribution to and understanding of the exhibition; secondly, a summative assessment and reflection on the event itself.

Assessment of the exhibition takes place within the school. It should take place throughout the whole process of the exhibition and should be rigorous. The IB seeks to ensure the integrity of the PYP without formally monitoring internal assessment or conducting external examinations. Schools may find it helpful to refer to the exhibition rubric in the *PYP exhibition guidelines* (2004), which is based on standard D2 of the IB *Programme standards and practices* (2005), as a guide to assessing their exhibition.

Teachers will find samples of how schools have engaged in the exhibition, together with further guidance for the exhibition, on the OCC.

A school's assessment policy

> There is a written assessment policy in place that is available to all sections of the school community.
>
> *Programme standards and practices:* C4.1, IB (2005)

An assessment policy reflects the school's philosophy and position on assessment. Developing an assessment policy is often the catalyst for schools to focus on their philosophy for assessment and to achieve a common understanding of their aims and objectives.

An assessment policy is a written document that aims to clarify teachers' understanding of the whole assessment process within their school setting. It is not a static document but one that is constantly evolving to reflect the assessment needs of the school. Collaborative reflection is a key component of developing an assessment policy, and must involve both teaching staff and administrators.

Once an assessment policy has been developed and agreed upon, it will apply across the whole school. A clear assessment policy needs to be established in the school and communicated to students and parents. It will include the following.

- Purpose for assessment (What and why do we assess?)
- Principles of assessment (What are the characteristics of effective assessments?)
- Assessment practice (How do we assess?)

When creating an assessment policy, schools need to keep in mind the overall value of the collaborative process that the school community will go through. The most important thing is the collaboration that must take place within a school in order to create an assessment policy. Although producing a written document is the intended outcome, it is the collaborative nature of the process and the associated discussions that are of most value. By involving those with a vested interest, the assessment policy then truly reflects the school's philosophy. A system should also be put in place to allow regular reviews of the assessment policy.

The following questions can be used to assist a school to establish an assessment policy.

- What is the school's philosophy of assessment?
- How is the school's philosophy of assessment aligned to its mission statement?
- What practices will be agreed upon in order to fulfill this philosophy?
- What are the purposes of assessment for all the components of the school community (students, teachers, parents, administrators)?

Schools will find it helpful to develop agreed assessment practices as a part of their assessment policy. These are practices that are put into place within the school that address how the school assesses, records and reports student progress.

The following questions can be used to help a school establish agreements on assessment.

- How should we structure assessment?
- How often should we assess?
- What do we assess?
- Who is responsible for assessment and how?
- How should assessment information be recorded?
- How should assessment information be analysed and reported?
- How will assessment information be reported to students and parents?
- Who will have access to assessment information and where will it be located?
- How often will we review our assessment practices?
- Are there any mandatory requirements that must be satisfied?

Understanding the PYP from analysis to synthesis

The preceding sections of this document present an analysis of the various components of the PYP approach to curriculum. However, in order to understand the PYP fully it is important to see this approach as a synthesis of these components. This synthesis operates at several levels.

A synthesis of the:

Essential elements	Teachers and students use powerful concepts to generate key questions with which to conduct inquiry into significant transdisciplinary content. In the course of this inquiry, students acquire essential knowledge and skills and engage in responsible action. They do so in a climate that fosters positive attitudes.
Written, taught and assessed curriculums	Using the written curriculum as the primary resource, teachers and students plan a process of structured inquiry involving a range of classroom activities—the taught curriculum. The assessed curriculum that provides data on the learning is integral to these activities, and focuses both on the quality of the learning process and on the outcomes of the learning.
Coherent transdisciplinary learning	At the heart of the PYP curriculum are the essential elements: knowledge, concepts, skills, attitudes and actions. These elements transcend subject-area boundaries and forge the curriculum into a coherent transdisciplinary whole that is engaging, relevant, challenging and significant.
School as a community of learners	In the PYP, students, parents and teachers are seen as partners united by a spirit of inquiry and a commitment to continuous improvement, working towards the common goal of providing every student with an education of the highest quality aimed at promoting international-mindedness.

The synthesis of the essential elements

The components of the PYP curriculum framework should be thought of, and be experienced as, contributing to an articulated whole. The PYP planner is an instrument for ensuring the synthesis of the essential elements in the planning, teaching and learning processes, while the learning outcomes described in the IB learner profile are a manifestation of that synthesis.

Synthesizing through the planner

In the PYP, most of the teaching and learning centres around the design of transdisciplinary units of inquiry. Each unit of inquiry is planned and recorded on the PYP planner. Each of these units:

- stands alone as an engaging, challenging, relevant and significant experience
- contributes to a coherent, school-wide programme of inquiry that is framed in terms of transdisciplinary themes of global significance

- draws together elements of different subject areas to support the exploration of a central idea
- is planned by teams of teachers working in collaboration, guided by a set of questions that are documented on the PYP planner
- is driven by a set of key questions that is conceptually based
- involves students in a range of learning experiences planned in response to the lines of inquiry
- builds on the prior knowledge of the students
- is constructed and conducted in such a way as to promote positive attitudes and provide opportunities for socially responsible action
- requires students to reflect on, and take responsibility for, their learning.

Through the units of inquiry, the essential elements are synthesized into a meaningful whole, a coherent approach to teaching and learning. Teachers and students generate questions and inquiries that have a conceptual base and are relevant to the central idea of the unit. Classroom experiences are planned as a direct response to these questions and inquiries. The classroom becomes a centre of structured inquiry through which students acquire and practise skills, and build new knowledge. They do so in a climate that fosters positive attitudes, and offers opportunities for responsible action. Assessment of student learning focuses on the quality of the students' understanding of the central idea and the breadth and depth of their responses to the lines of inquiry.

It is important to note that the programme of inquiry does not necessarily constitute a school's whole programme. Well-planned inquiries provide an ideal context for learning both within and outside the programme of inquiry. It is also recognized that the subject areas have an integrity and essence of their own. Teaching about and through the subject areas is advocated when it enhances the transdisciplinary learning defined in the PYP, but not when the integration results in teaching and learning that is contrived and superficial.

The outcome of the synthesis as represented in the IB learner profile

The beliefs and values of the PYP are represented in the form of the IB learner profile. This profile lists, as attributes, the learning outcomes of the curriculum and focuses attention on the fact that student learning is the purpose of schools.

The IB learner profile also represents a synthesis of the essential elements of the PYP. Throughout the primary years, the students engage in structured inquiry that synthesizes knowledge, concepts, skills, attitudes and action. In doing so, they develop the attributes described in the learner profile. This profile provides powerful goals that serve learning across all areas of the curriculum.

The synthesis of the essential elements of the PYP

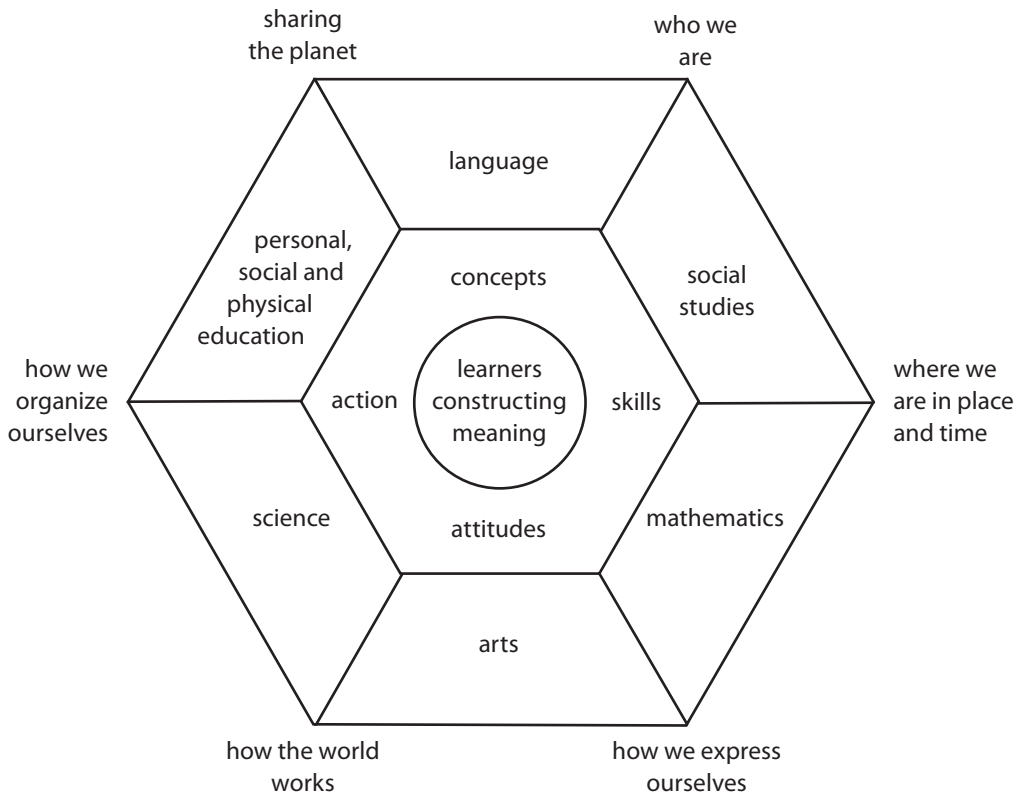

Figure 18

What changes will this mean for the school?

There is a belief in the PYP in a particular approach to teaching and learning. Nevertheless, it is also recognized that many educational innovations (or, more accurately, educational reworkings) suffer from the advocacy of a narrow, exclusive approach. The PYP represents an approach to teaching that is broad and inclusive, in that it provides a context within which a wide variety of teaching strategies and styles can be accommodated, provided that they are driven by a spirit of inquiry and a clear sense of purpose.

The degree of change required to implement this approach at the school-wide level will, obviously, depend on conditions within the school at the time of implementation. However, to be realistic, the school community must recognize that:

- school-wide adoption of the PYP approach will require change not only in the classroom but throughout the school
- this change is likely to be slow, beset with insecurities and with difficulties (these difficulties are always associated with any change that requires people to examine and modify their current practice)
- engaging in this change process will have a beneficial impact on the whole school, the individual teacher and, most significantly, on the quality of student learning, and the struggle will be worth it
- the process of change in teaching practices will require substantial support from all teachers and administrators.

What changes will this mean for teachers?

Again, the degree of change will depend on the individual teacher. For those teachers who have grown weary of imposed change for which they see little point, it should be stressed that teachers are not expected to discard years of hard-earned skill and experience in favour of someone else's ideas on good teaching. It is suggested, rather, that teachers engage in reflection on their own practice, both individually and in collaboration with colleagues, with a view to sharing ideas and strengths, and with the primary aim of improving their teaching to improve student learning. In doing so, they will be modelling the skills and attitudes that have been identified as essential for students.

As an aid to reflection, a set of generic examples of good practice has been produced that, it is believed, is worthy of consideration by anyone committed to continuous improvement. Subject-specific examples of changing practice are to be found in the annex.

PYP practices

Planning		Teaching		Assessing	
Increased emphasis on:	Decreased emphasis on:	Increased emphasis on:	Decreased emphasis on:	Increased emphasis on:	Decreased emphasis on:
planning collaboratively using an agreed system and the PYP planner where appropriate	planning in isolation from other teachers	using a range and balance of teaching strategies	over-reliance on a limited set of teaching strategies	viewing planning, teaching and assessing as interconnected processes	viewing planning, teaching and assessing as isolated processes
planning based on agreed student-learning outcomes and in the context of a coherent school-wide programme	planning disconnected from the curriculum	grouping and regrouping students for a variety of learning situations	over-reliance on one grouping strategy	using a range and balance of assessment strategies and tools	over-reliance on one assessment strategy or tool
involving students in planning for their own learning and assessing	the teacher making all the decisions	viewing students as thinkers with emerging theories of the world	viewing the teacher as the sole authority	involving students in self- and peer-assessment	viewing assessment as the sole prerogative of the teacher
planning that builds upon students' prior knowledge and experience	planning that ignores students' prior knowledge and experience	building on what students know	focusing on what students do not know	using a range and balance of recording and reporting strategies	over-reliance on one strategy of recording and reporting
planning fewer inquiries, to be explored in depth	planning a large number of activities that will be covered superficially	using multiple resources representing multiple perspectives	over-reliance on one teaching resource from one culture	seeking student responses in order to understand their current understanding	seeking student responses solely to identify the right answer
addressing assessment issues throughout the planning process	addressing assessment issues at the conclusion of the planning process	empowering students to feel responsible and to take action	teaching about responsibility and the need for action by others	using formative assessment to give students regular and ongoing feedback throughout the unit	concluding each unit only by summative testing

Figure 19

Planning		Teaching		Assessing	
Increased emphasis on:	Decreased emphasis on:	Increased emphasis on:	Decreased emphasis on:	Increased emphasis on:	Decreased emphasis on:
planning that emphasizes the connections between and beyond the subject areas	planning that presents the curriculum as separate, isolated subject areas	involving students actively in their own learning	viewing students as passive recipients	enabling students to see assessment as a means of describing learning and improving learning	assessing for the sole purpose of assigning grades
planning that recognizes a variety of levels of language competency	planning that assumes a single level of language competency	pursuing open-ended inquiry and real-life investigations	a teacher-directed focus on rigid objectives	assessing the levels of students' current knowledge and experience before embarking on new learning	embarking on new learning before assessing the levels of students' current knowledge and experience
planning that recognizes a range of ability levels	planning that assumes a single level of ability	maintaining constant awareness of the needs of additional-language learners	employing teaching strategies suitable only for students whose mother tongue is the language of instruction	evaluating collaboratively using an agreed, flexible system.	evaluating units in isolation from other teachers.
planning inquiries that explore similarities and differences between cultures/places	planning activities that focus on one culture/place	addressing the needs of students with different levels and types of ability.	employing teaching strategies suitable for one level and type of ability.		
planning inquiries that explore broad human experiences from a range of perspectives	planning activities where the cross-cultural dimension is tokenistic and the international dimension is tacked on				
planning inquiries that focus directly on significant issues.	planning activities in which exploration of significant issues is incidental.				

Figure 19 (continued)

The PYP as a holistic programme

The word "holistic" is much abused. Nonetheless, it is applicable in describing the PYP curriculum model that presents the essential elements as a whole; the written, taught and assessed components of the curriculum as a whole; the transdisciplinary themes and subject areas as aspects of a whole; and the school community as a whole. It is a difficult task to try to represent a holistic programme visually, particularly one as multifaceted as the PYP. However, figure 20 is an attempt to condense and articulate those parts as simply as possible.

Overview of the PYP

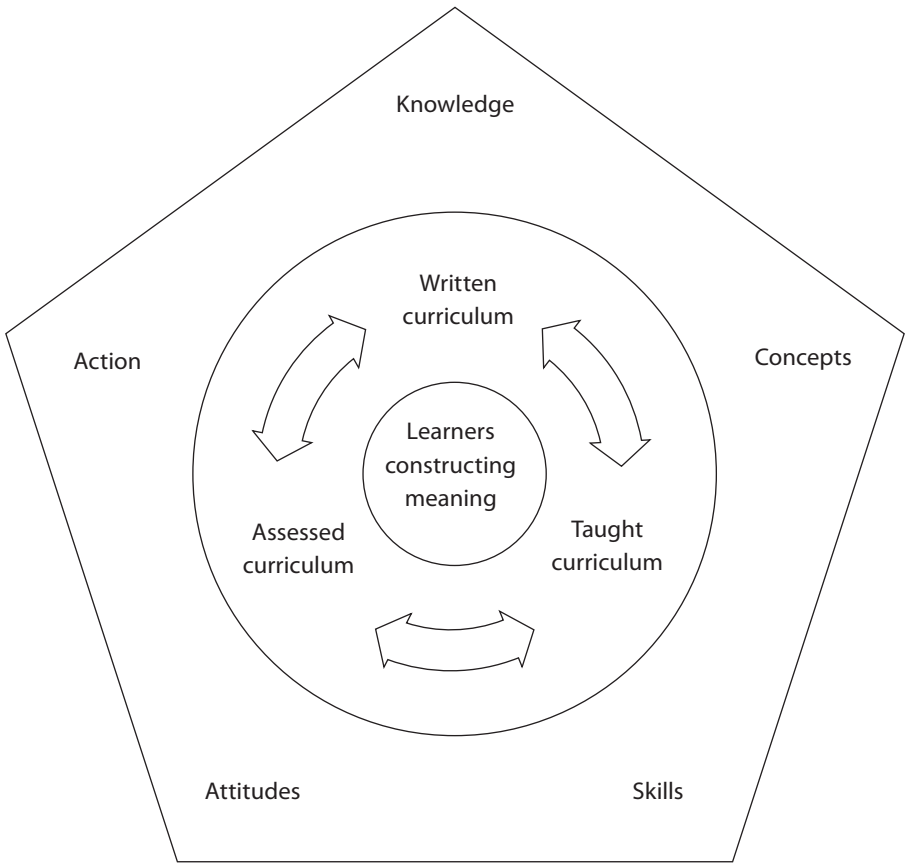

Figure 20

Finally, there is one greater whole that is firmly supported within the PYP. The IB is working towards the formation of IB World Schools into a collaborative international community, in which each school retains its identity and autonomy but shares its strengths and ideas with other IB World Schools. The movement towards the creation of a system of international education that will better serve our students is welcomed within the PYP community.

This document represents the work of many teachers, administrators and consultants over an extended period. The IB trusts that it provides one more piece of the picture, one more step towards creating the system of international education in which we so firmly believe.

Bibliography

Alexander, R. 1995. *Versions of Primary Education*. Routledge. 0-415-12838-2.

Bartlett, K. 1998. "International Curricula: More or Less Important at the Primary Level?" in *International Education: Principles and Practice*, edited by Hayden, M and Thompson, J. Kogan Page, pp 77–91.

Bartlett, K. 1997. "Articulating the International Curriculum: Continuity through Outcomes (Part 2)". *International Schools Journal* 17, number 1, pp 50–57.

Bartlett, K. 1997. "How the Primary Years Programme Came into Being". *IB World*, number 16, pp 15–17.

Bartlett, K. 1996. "Articulating the International Curriculum: Continuity through Commonalities (Part 1)". *International Schools Journal* 16, number 1, pp 30–38.

Bartlett, K. 1994. "Internationalism: Getting Beneath The Surface. Part 2: The Role of Language". *International Schools Journal*, number 27, pp 53–56.

Bartlett, K. 1993. "Internationalism: Getting Beneath The Surface. Part 1: Internationalism? It's about thinking!" *International Schools Journal*, number 26, pp 35–38.

Bartlett, K. 1992. "Defining International Education: A Proposal for the Future". *International Schools Journal*, number 23, pp 45–52.

Bartlett, K. 1989. "Translating Philosophy into Action". *International Schools Journal*, number 18, pp 59–67.

Boyer, EL. 1995. *The Basic School: A community for learning*. The Carnegie Foundation for the Advancement of Teaching. 0-931050-48-0.

Bredekamp, S and Copple, C (editors). 1997. *Developmentally Appropriate Practice in Early Childhood Programs*. National Association for the Education of Young Children. 0-935989-79-X.

Bruner, J. 1990. *Acts of Meaning*. Harvard University Press. 0-674-00361-6.

Bruner, J. 1986. *Actual Minds, Possible Words*. Harvard University Press. 0-674-00366-7.

Caldwell, BJ and Spinks, JM. 1998. *Beyond the Self-Managing School*. RoutledgeFalmer. 0-7507-0448-9.

Ceppi, G and Zini, M. *Children, Spaces, Relations: Metaproject for an environment for young children*. Reggio Children Domus Academy Research Center. 88-87960-17-8.

Chandler, D. 2002. *Semiotics: The Basics*. Routledge. 0-415-35111-1.

Coles, MJ and Southworth, G. *Developing Leadership. Creating the schools of tomorrow*. Open University Press. 0-335-21542-4.

Corson, D. 2001. *Language Diversity and Education*. Lawrence Erlbaum Associates. 0-8058-3449-4.

Corson, D. 1999. *Language Policy in Schools: A Resource for Teachers and Administrators*. Lawrence Erlbaum Associates. 0-8058-3296-3.

Costa, AL (editor). 2001. *Developing Minds: A resource book for teaching thinking* (3rd edition). Association for Supervision and Curriculum Development. 0-87120-379-0.

Costa, AL and Kallick, B (editors). 2000. *Assessing and Reporting on Habits of Mind*. Association for Supervision and Curriculum Development. 0-87120-370-7.

Costa, AL and Kallick, B (editors). 2000. *Discovering and Exploring Habits of Mind*. Association for Supervision and Curriculum Development.

DeVries, R, Zan, B, Hildebrandt, C, Edmiaston, R, and Sales, C. 2002. *Developing Constructivist Early Childhood Curriculum. Practical principles and activities*. Teachers College Press. 0-8077-4120-5.

Duncan, A. 1993. *What Primary Teachers Should Know About Maths* (2nd edition). Hodder & Stoughton. 0-340-64377-3.

Edwards, C, Gandini, L and Forman, G. 1998. *The Hundred Languages of Children (The Reggio Emilia Approach: Advanced Reflections*) (2nd edition). Ablex Publishing Corporation. 1-56750-311-X.

Eisner, EW. 2001. "The Role of the Arts in Cognition and Curriculum" in *Developing Minds: A Resource Book for Teaching Thinking* (3rd edition), edited by Costa, A. Association for Supervision and Curriculum Development (ASCD).

Eisner, EW. 1985. *The Educational Imagination On the Design and Evaluation of School Programs* (2nd edition). Macmillan Publishing Company. 0-02-332110-5.

ESTYN. 2002. *Standards and Quality in Personal and Social Education in Primary and Secondary Schools in Wales*. Schools inspection service in Wales.

Fullan, M. 2001. *Leading in a Culture of Change*. Jossey-Bass Publishers. 0-7879-5395-4.

Fullan, M. 2001. *The New Meaning of Educational Change* (3rd edition). RoutledgeFalmer. 0-415-26020-5.

Gallas, K. 1994. *The Languages of Learning. How children talk, write, dance, draw, and sing their understanding of the world*. Teachers College Press. 0-8077-3305-9.

Gardner, H. 1993. *Multiple Intelligences: The theory in practice*. Basic books. 0-465-01822-X.

Grennon Brooks, J and Brooks, MG. 2001. *In Search of Understanding. The Case for Constructivist Classrooms*. Association for Supervision and Curriculum Development. 0-87120-211-5.

Halliday, M. 1980. "Three Aspects of Children's Language Development: Learning language, Learning through Language, Learning about Language", in *Oral and Written Language Development Research*, edited by Goodman, Y, Haussler, MH and Strickland, D, pp 7–19. National Council of Teachers of English.

Hargreaves, A and Fink, D. 2006. *Sustainable Leadership*. Jossey-Bass Publishers. 0-7879-6838-2.

Hayden, M, Thompson, J, Walker, G (editors). 2002. *International Education in Practice: Dimensions for national and international schools*. Kogan Page Limited. 0-7494-3835-5.

Hayes Jacobs, H. 2004. *Getting Results with Curriculum Mapping*. Association for Supervision and Curriculum Development. 0-87120-999-3.

Hayes Jacobs, H. 1997. *Mapping the Big Picture: Integrating curriculum and assessment K-12*. Association for Supervision and Curriculum Development. 0-87120-286-7.

Hayes Jacobs, H. 1989. *Interdisciplinary Curriculum: Design and implementation*. Association for Supervision and Curriculum Development.

Innis, RE. 1985. *Semiotics: An introductory anthology*. Indiana University Press. 0-253-20344-9.

Kozulin, A, Gindis, B, Ageyev, VS, and Miller, SM (editors). 2003. *Vygotsky's Educational Theory in Cultural Context* (Learning in Doing: Social, Cognitive & Computational Perspectives S.). Cambridge University Press. 0-5215-2883-6.

Llewellyn, D. 2002. *Inquire Within: Implementing inquiry-based science standards*. Corwin Press. 0-7619-7745-7.

Lynn Erickson, H. 2002. *Concept-Based Curriculum and Instruction: Teaching beyond the facts*. Corwin Press. 0-7619-4640-3.

Lynn Erickson, H. 2001. *Stirring the Head, Heart, and Soul: Redefining curriculum and instruction* (2nd edition). Corwin Press. 0-8039-6885-X.

McTighe, J and Wiggins, G. 1999. *The Understanding by Design Handbook*. Association for Supervision and Curriculum Development. 0-87120-340-5.

McTighe, J and Wiggins, G. 2004. *Understanding by Design Professional Development Workbook*. Association for Supervision and Curriculum Development. 0-87120-855-5.

National Council of Teachers of Mathematics. 2000. *Principles and standards for school mathematics and teacher education: Preparing and empowering teachers*. NCTM.

New Zealand Ministry of Education. 1997. *Social studies in the New Zealand Curriculum*.

New Zealand Ministry of Education. 1997. *Science in the New Zealand Curriculum*.

Olson, DR and Torrance, N (editors). 1998. *The Handbook of Education and Human Development. New Models of Learning, Teaching and Schooling*. Blackwell Publishers. 0-631-21186-1.

Perkins, D. 1995. *Outsmarting IQ: The emerging science of learnable intelligence*. The Free Press. 0-02-925212-1.

Project Zero. 2001. *Making Learning Visible. Children as individual and group learners*. Reggio Children. 88-87960-25-9.

Reggio Children. 1995. *Le Fontane*. Reggio Children S.r.l.

Reggio Children. *Reggio Children*. Reggio Children S.r.l.

Reggio Children. 1997. *Scarpa e Metro*. Reggio Children S.r.l.

Selley, N. 1999. *The Art of Constructivist Teaching in the Primary School. A Guide for Students and Teachers*. David Fulton Publishers. 1-85346-572-0.

Short, KG. 1997. *Literature as a Way of Knowing*. Stenhouse Publishers. 1-57110-0636.

Short, KG and Burke, C. 1991. *Creating Curriculum: Teachers and students as a community of learners*. Heinemann. 0-435-08590-5.

Short, KG, Harste, JC and Burke, C. 1996. *Creating Classrooms for Authors and Inquirers* (2nd edition). Heinemann. 0-435-08850-5.

Short, KG, Schroeder, J, Laird, J, Kauffman, G, Ferguson, M and Crawford, K. 1996. *Learning Together Through Inquiry. From Columbus to Integrated Curriculum*. Stenhouse Publishers. 1571100334.

Tobin, K (editor). 1995. *The Practice of Constructivism in Science Education*. Lawrence Erlbaum Associates. 0-8058-1878-2.

Victorian Curriculum and Assessment Authority. 2008. *Victorian Essential Learning Standards: Physical, Personal and Social Learning Strand—Health and Physical Education*. VCAA.

Vygotsky, L. 1999. *Thought and Language*. The MIT Press. 0-262-72010-8.

Wells Lindfor, J. 1999. *Children's Inquiry: Using language to make sense of the world*. Teachers College Press. 0-8077-3836-0.

Wiggins, G. 1998. *Educative Assessment. Designing Assessments to Inform and Improve Student Performance*. Jossey-Bass Publishers. 0-7879-0848-7.

Wiggins, G and McTighe, J. 2005. *Understanding by Design. Expanded 2nd edition*. Association for Supervision and Curriculum Development. 1-4166-0035-3.

Wiggins, G and McTighe, J. 2000. *Understanding by Design: Study guide*. Association for Supervision and Curriculum Development. 0-87120-386-3.

Wiggins, G and McTighe, J. 1998. *Understanding by Design*. Association for Supervision and Curriculum Development. 0-87120-313-8.

Williams, B and Woods, M. 1997. "Building on Urban Learners Experiences". Association for Supervision and Curriculum Development.

Wurm, JP. 2005. *Working in the Reggio Way: A beginner's guide for American teachers*. National Association for the Education of Young Children. 1-929610-64-5.

Introduction

The Primary Years Programme (PYP) is first and foremost a transdisciplinary programme organized around six themes of global significance. Additionally, there are six defined subject areas that have value in themselves and provide students with knowledge and skills to explore the six transdisciplinary themes. Students should be made aware of the links across the curriculum in order to understand the interconnected nature of the subject areas, both with one another and with the transdisciplinary themes.

This annex provides information about the role that each subject area plays in the PYP. The IB also publishes a series of subject-specific scope and sequences, available for downloading from the online curriculum centre (OCC) or for purchase from the IB store. While wholesale use of the PYP scope and sequences is not mandatory, these documents contain sample materials that will be of interest to schools as they go about the process of documenting subject area learning in their own context. The sample materials include sample planning processes, learning continuums and a range of completed planners.

Please note that mathematics, language(s) of instruction, social studies and science need to be the responsibility of the classroom teacher: the teacher with whom the students spend most of their time. Single-subject teaching of these areas is not consistent with the PYP model of transdisciplinary learning—learning that transcends the confines of the subject areas, but is supported by them. Personal and social education is the responsibility of all PYP teachers.

Language in the Primary Years Programme

Beliefs and values in language

> Language stands at the center of the many interdependent cognitive, affective, and social factors that shape learning.
>
> David Corson, *Language Policy in Schools: A Resource for Teachers and Administrators* (1999)

The need to communicate is instinctive. The development of language is fundamental to that need to communicate; it supports and enhances our thinking and understanding. Language permeates the world in which we live; it is socially constructed and dependent on the number and nature of our social interactions and relationships.

The learning process simultaneously involves learning language—as learners listen to and use language with others in their everyday lives; learning about language—as learners grow in their understanding of how language works; and learning through language—as learners use language as a tool to listen, think, discuss and reflect on information, ideas and issues (Halliday 1980). An appreciation of these aspects of language learning may help teachers better understand and enhance students' learning. However, these three aspects are so inextricably linked they are best not thought of as discrete processes.

Language plays a vital role in the construction of meaning. It empowers the learner and provides an intellectual framework to support conceptual development and critical thinking. In the PYP, it is recognized that the teaching of language should be in response to the previous experience, needs and interests of the student, rather than the consequence of a predetermined, prescriptive model for delivering language. Fragmenting learning into the acquisition of isolated skill sets can create difficulties for learners—for example, learners may be able to read, write and spell words correctly in isolation but may not be able to read, write or spell those same words in other contexts. Learners' needs are best served when they have opportunities to engage in learning within meaningful contexts, rather than being presented with the learning of language as an incremental series of skills to be acquired.

PYP schools have a special responsibility to recognize and support language development to ensure that all students are provided with the environment and the necessary language support to enable them to participate fully in the academic programme and in the social life of the school, as well as to develop as individuals. All teachers in a PYP school are considered teachers of language. Language learning plays a major role in schools where the language(s) of instruction may not be the student's first language. Research has shown that development of mother-tongue language is crucial for cognitive development and in maintaining cultural identity. It also has the potential to increase intercultural awareness and understanding, and enables students to remain in touch with, and maintain esteem for, the language, literature and culture of their home country. It is a strong predictor of their long-term academic achievement, including acquisition of other languages. Respect for differences between languages and between dialects should be promoted.

In PYP schools all students have the opportunity to learn more than one language from at least the age of 7. Every learner benefits from having access to different languages, and, through that access, to different cultures and perspectives. Acquisition of more than one language enriches personal development and helps facilitate international-mindedness. For these reasons it could be argued that bilingualism, if not multilingualism, is the hallmark of a truly internationally minded person and that this requirement should be central to all three IB programmes. However, to accept this premise one would have to argue in support of the reciprocal position, that a monolingual person has a limited capacity to be internationally minded.

This is not the position the PYP has chosen to adopt. As well as the learning of an additional language, the other elements of the PYP framework that contribute to international-mindedness are described in *Making the PYP happen: A curriculum framework for international primary education (*2009*)*. Most IB World Schools implementing the PYP, particularly state or national system primary schools, would struggle to create a learning community where bilingualism was a realistic goal—indeed, it would be an impossibility in most cases. Consequently, the strategic goal of the IB to broaden access to its programmes would be in conflict with the notion of IB World Schools having bilingualism as a goal for all of their students.

The IB learner profile is integral to teaching and learning language in the PYP because it represents the qualities of effective learners and internationally minded students. The learner profile, together with the five essential elements of the programme—knowledge, concepts, skills, attitudes and action—informs planning, teaching and assessing in language.

Good language practice

Language is the major connecting element across the curriculum. Therefore, in a PYP school the focus is not only on language for its own sake, but also on its application across the subject areas and throughout the transdisciplinary programme of inquiry. It also facilitates connections with the wider community.

Language provides a vehicle for inquiry. In an inquiry-based classroom, teachers and students enjoy using language, appreciating it both functionally and aesthetically. The love and enjoyment of language through the integration of literature into student inquiry is an indicator of good practice in a PYP classroom. For example, this may include: a series of books read as an author study; regional fairy tales as part of a unit of inquiry with a particular social studies emphasis; discussing a scientist's biography or a newspaper article to front-load a science investigation; early years counting stories as reinforcement for mathematics development; and the comparison and practice of illustration techniques to encourage the development of art skills.

Teachers in PYP schools should strive to develop a caring language community in which all students feel accepted and confident that they will be supported by others in language learning and in taking risks. To encourage students to take risks in language learning (especially learning an additional language), they need to believe that there is a good chance they will succeed; they may not be willing to try unless they believe they have the confidence to get it at least partially right. Teachers need to structure teaching/learning situations so that students have opportunities for success. They use techniques that support students during the communication process and provide the "missing bits" when students cannot fully express their meaning—this is often referred to as *scaffolding*. In practical terms, scaffolding includes such things as body language and gestures, language accompanying actions, building on to what other students say, and guided questioning.

Learning language in a PYP classroom extends beyond the classroom walls, and has close connections to the central school library/media centre and to other classrooms. The teacher plans in collaboration with other classroom teachers and single-subject teachers. Additional-language teachers play a particularly important role in reinforcing, supporting and extending the classroom work.

The PYP classroom is also connected to the broader world through technology: students research and communicate not only through printed media but also through global electronic networks in order to access a vast range of multimedia resources.

A PYP teacher's personal knowledge of language teaching and learning is of key importance. What teachers themselves understand shapes which resources they choose, what learning experiences they design and how effectively they teach. The teacher's own interest in, and development of, language teaching and learning is maintained through regular professional development, reading of professional journals and, especially, through regular contact with colleagues who share their commitment to teaching language through inquiry. Commercially available resources for teaching language are carefully evaluated to ensure that they meet the needs of the teacher and the students, and the requirements of the programme.

Effective language teaching and learning are social acts, dependent on relationships with others, with context, with the environment, with the world, and with the self. Such learning is relevant, engaging, challenging and significant. Exposure to and experience with languages, with all their richness and diversity, creates an inquisitiveness about life and learning, and a confidence about creating new social interactions. Language provides a vehicle for learners to engage with the world and, in an IB World School, to relate to, and accept, responsibility for the mission of the IB to "help to create a better and more peaceful world".

The role of language in the programme of inquiry

Language is involved in all learning that goes on in a school, in both the affective and effective domains. Learners listen, talk, read and write their way to negotiating new meanings and understanding new concepts. In the "knowledge" area of the PYP, language is the most significant connecting element across the school's curriculum, both within and outside its transdisciplinary programme of inquiry. It is the school's responsibility to provide authentic contexts for language teaching and learning in all areas of the curriculum that are a reflection of, and relevant to, the community of learners, and to the educational theories underpinning the programme. In PYP schools there should be opportunities for students to negotiate their roles. Literacy, including oral and visual literacy as well as the ability to read and write, becomes increasingly important as greater demands are placed on learners as participants in the learning process.

The programme of inquiry provides an authentic context for learners to develop and use language. Wherever possible, language should be taught through the relevant, authentic context of the units of inquiry. The teacher should provide language learning opportunities that support learners' inquiries and the sharing of their learning. Regardless of whether language is being taught within or outside the programme of inquiry, it is believed that purposeful inquiry is the way in which learners learn best. The starting point should always be learners' prior experience and current understanding.

When teachers plan learning experiences that enable learners to develop language within meaningful and enjoyable contexts, learners are able to make connections, apply their learning, and transfer their conceptual understanding to new situations. This progressive conceptual development, together with an enjoyment of the process, provides the foundation for lifelong learning.

Examples of planning processes to support language learning both within and outside the programme of inquiry can be found in the PYP *Language scope and sequence* (2009).

How language practices are changing

Structured, purposeful inquiry is the main approach to teaching and learning language in the PYP. However, it is recognized that many educational innovations (or, more accurately, educational reworkings) suffer from the advocacy of a narrow, exclusive approach. The PYP represents an approach to teaching that is broad and inclusive in that it provides a context within which a wide variety of teaching strategies and styles can be accommodated, provided that they are driven by a spirit of inquiry and a clear sense of purpose.

The degree of change needed to teach language in this way will depend on the individual teacher. For those teachers who have grown weary of imposed change for which they see little point, it should be stressed that teachers are not expected to discard years of hard-earned skill and experience in favour of someone else's ideas on good teaching. It is suggested, rather, that teachers engage in reflection on their own practice, both individually and in collaboration with colleagues, with a view to sharing ideas and strengths, and with the primary aim of improving their teaching to improve student learning. In doing so, they will be modelling the skills and attitudes that have been identified as essential for students.

As an aid to reflection, the following set of subject-specific examples of good practice has been produced. It is believed that these examples are worthy of consideration by anyone committed to continuous improvement.

How are language practices changing?	
Increased emphasis on:	**Decreased emphasis on:**
promoting integrated language development	teaching language as isolated strands
language as a transdisciplinary element throughout the curriculum	language as a separate discipline
additional-language teachers viewed (and viewing themselves) as PYP teachers	additional-language teachers seen as solely single-subject teachers
a literature-based approach to learning language	using skill-drill texts and workbooks to learn language
a teaching approach that sees making mistakes in language as inevitable and necessary for learning	a teaching approach that focuses on encouraging students not to make mistakes in language
reading for meaning	decoding only for accuracy
reading selected according to interest level	reading selected according to decoding level
student-selected reading materials	teacher-directed reading materials
making world classics available for reading	having only school classics available for reading
making culturally diverse reading material available	having only monocultural reading materials available
focusing on meaning when reading and writing	focusing primarily on accuracy when reading and writing
encouraging appropriate cooperative discussion in the classroom	enforcing silent, individual work in the classroom
students engaged in spontaneous writing	students carrying out teacher-imposed writing
a variety of scaffolded learning experiences—with the teacher providing strategies for the student to build on his or her own learning	activities where teachers simply model language for students
writing as a process	writing only as a product
developing a range of independent spelling strategies	a dependence on the teacher as the only source of correct spelling
nurturing appreciation of the richness of language	language study as grammar and syntax
literature as a means of understanding and exploring	literature study as vocabulary, grammar and syntax
teaching students to read and research using multimedia resources	providing print-only resources for reading and research
using language for creative problem solving and information processing	using language for rote learning
a range of appropriate assessment methods such as portfolios, conferencing, miscue analysis, writing sample analysis, response journals.	standardized reading and writing assessments.

Knowledge and skills in language

Language is a complex web of connections that transcends the artificial separations of disciplines. When the three aspects of learning language, learning about language and learning through language, introduced earlier in this document, operate together in a relevant context, they provide the most supportive learning environment for language learners.

We need to develop students' use of language, appreciation of language, awareness of the nature of language, of the many influences on language, and of the variety in and between languages and dialects. Students should recognize the transdisciplinary nature of language—they use language within and across the subject areas and in a way that transcends them, both inside and outside the classroom. They should be encouraged to recognize that competency in language—and in more than one language—is a valuable life skill, a powerful tool both in societal communication and as a means of personal reflection. Furthermore, learning that language and literature are creative processes encourages the development of imagination and creativity through self-expression.

Language strands

What do we want students to know?

The PYP has identified three strands—**oral language, visual language, written language**—that are learned across and throughout the curriculum, with each strand being an integral component of language learning. Each strand has been considered from both the **receptive** aspect—receiving and constructing meaning, and **expressive** aspect—creating and sharing meaning (figure 21). While the receptive and expressive aspects are clearly reciprocal, the processes involved in receiving and constructing meaning are different from those involved in creating and sharing meaning. The learner's ability to understand language and use it effectively varies in different situations and from one individual to another. For this reason, it is important to distinguish between these two modes of learning and the demonstrated proficiencies associated with them. For example, a learner may listen attentively and reveal understanding through written or visual representations, but may require support to communicate ideas orally in the classroom.

The acknowledgment of both the receptive and expressive aspects of the language strands serves to ensure that teachers will be aware of the need to provide a balanced programme. Opportunities to listen to, and receive, ideas and information in oral form should be balanced with opportunities to express ideas orally. In visual language, learners will view and interpret other people's work and create and share their own presentations. The interwoven receptive and expressive aspects of the oral and visual strands are represented in one continuum for each strand. In written language, learners will experience reciprocal gains as they develop skills and understanding in reading and writing. In the *Language scope and sequence* (2009), the strands of oral, visual and written language have been described separately, and are represented by four continuums: listening and speaking; viewing and presenting; reading; writing.

Strand	Receptive—receiving and constructing meaning	Expressive—creating and sharing meaning
Oral language	Listening ◄——————►	Speaking
Visual language	Viewing ◄——————►	Presenting
Written language	Reading	Writing

Figure 21

Receptive and expressive aspects of language strands

Oral language—listening and speaking

Listening and speaking are natural, developmental processes that infants and young children are immersed in from their earliest experiences. Almost all children arrive at school with an impressive command of their mother-tongue language. However, the expectations and approach to language development in school is often very different from the successful learning environment the child has previously experienced. In the transition from home to school, or from one school to another, it is important to acknowledge the language profile of the individual and build on previous learning in ways that are positive and productive.

Oral language encompasses all aspects of listening and speaking—skills that are essential for ongoing language development, for learning and for relating to others. Listening (the receptive mode) and speaking (the expressive mode) work together in a transactional process between listeners and speakers. A balanced programme will provide meaningful and well-planned opportunities for learners to participate as listeners as well as speakers. Listening involves more than just hearing sounds. It requires active and conscious attention in order to make sense of what is heard. Purposeful talk enables learners to articulate thoughts as they construct and reconstruct meaning to understand the world around them. Oral language involves recognizing and using certain types of language according to the audience and purposes (for example, the language used at home, the language of the classroom, the language of play, the language of inquiry, conversations with peers, giving instructions, interpreting creative texts, the language of fantasy, the language of different generations, of different times and places).

In an inquiry-based learning environment, oral language exposes the thinking of the learner. It is a means by which "inner speech" (Vygotsky 1999) can be communicated and shared to negotiate and construct meaning and develop deeper levels of understanding.

Visual language—viewing and presenting

Viewing and presenting are fundamental processes that are historically and universally powerful and significant. The receptive processes (viewing) and expressive processes (presenting) are connected and allow for reciprocal growth in understanding; neither process has meaning except in relation to the other. It is important to provide a balanced programme with opportunities for students to experience both viewing and presenting. These processes involve interpreting, using and constructing visuals and multimedia in a variety of situations and for a range of purposes and audiences. They allow students to understand the ways in which images and language interact to convey ideas, values and beliefs. Visual texts may be paper, electronic or live, observable forms of communication that are consciously constructed to convey meaning and immediately engage viewers, allowing them instant access to data. Examples of visual texts are: advertisements, brochures, computer games and programs, websites, movies, posters, signs, logos, flags, maps, charts, graphs, diagrams, illustrations, graphic organizers, cartoons and comics. Learning to interpret this data, and to understand and use different media, are invaluable life skills.

Acquiring skills related to information and communication technology (ICT) and visual texts is significant because of their persuasive influence in society. It is important to learn how visual images influence meaning and produce powerful associations that shape the way we think and feel. Opportunities that invite students to explore the function and construction of images facilitate the process of critically analysing a range of visual texts. Learning to understand and use different visual texts expands the sources of information and expressive abilities of students.

Written language—reading

Reading is a developmental process that involves constructing meaning from text. The process is interactive and involves the reader's purpose for reading, the reader's prior knowledge and experience, and the text itself. It begins to happen when the young learner realizes that print conveys meaning and becomes concerned with trying to make sense of the marks on the page. The most significant contribution parents and teachers can make to success in reading is to provide a captivating range of picture books and other

illustrated materials to share with beginning readers. Enthusiasm and curiosity are essential ingredients in promoting the desire to read. Children of all ages need to experience and enjoy a wide variety of interesting, informative, intriguing and creative reading materials.

Reading helps us to clarify our ideas, feelings, thoughts and opinions. Literature offers us a means of understanding ourselves and others, and has the power to influence and structure thinking. Well-written fiction provides opportunities for learners to imagine themselves in another's situation, reflecting on feelings and actions, and developing empathy. The ability to read and comprehend non-fiction is essential for the process of inquiry. As inquirers, learners need to be able to identify, synthesize and apply useful and relevant information from text. Teachers should provide a balance between fiction and non-fiction, to meet the range of learning needs and interests of their students.

Children learn to read by reading. In order to develop lifelong reading habits, learners need to have extended periods of time to read for pleasure, interest, and information, experiencing an extensive range of quality fiction and non-fiction texts. As learners engage with interesting and appealing texts, appropriate to their experiences and developmental phase, they acquire the skills, strategies and conceptual understanding necessary to become competent, motivated, independent readers.

Written language—writing

Writing is a way of expressing ourselves. It is a personal act that grows and develops with the individual. From the earliest lines and marks of young learners to the expression of mature writers, it allows us to organize and communicate thoughts, ideas and information in a visible and tangible way. Writing is primarily concerned with communicating meaning and intention. When children are encouraged to express themselves and reveal their own "voice", writing is a genuine expression of the individual. The quality of expression lies in the authenticity of the message and the desire to communicate. If the writer has shared his or her message in such a way that others can appreciate it, the writer's intention has been achieved. Over time, writing involves developing a variety of structures, strategies and literary techniques (spelling, grammar, plot, character, punctuation, voice) and applying them with increasing skill and effectiveness. However, the writer's ability to communicate his or her intention and share meaning takes precedence over accuracy and the application of skills. Accuracy and skills grow out of the process of producing meaningful communication. Children learn to write by writing. Acquiring a set of isolated skills will not turn them into writers. It is only in the process of sharing their ideas in written form that skills are developed, applied and refined to produce increasingly effective written communication.

Key concepts in the PYP: what do we want students to understand about language?

Central to the philosophy of the PYP is the principle that purposeful, structured inquiry is a powerful vehicle for learning that promotes meaning and understanding, and challenges students to engage with significant ideas. Hence in the PYP there is also a commitment to a **concept-driven curriculum** as a means of supporting that inquiry. There are clusters of ideas that can usefully be grouped under a set of overarching concepts, each of which has major significance within and across disciplines, regardless of time or place.

These key concepts are one of the essential elements of the PYP framework. It is accepted that these are not, in any sense, the only concepts worth exploring. Taken together they form a powerful curriculum component that drives the teacher- and/or student-constructed inquiries that lie at the heart of the PYP curriculum.

When viewed as a set of questions, the concepts form a research tool that is manageable, open-ended and more readily accessible to students. It is these questions, used flexibly by teachers and students when planning an inquiry-based unit, that shape that unit, giving it direction and purpose.

The following table explains each concept from both the generic perspective and the language perspective; a full explanation of the key concepts is found in the "Concepts: what do we want students to understand?" section.

Concept	Generic perspective	Language perspective
Form What is it like?	Everything has a form with recognizable features that can be observed, identified, described and categorized.	Every language has a form and a structure that makes it unique. Form may vary according to whether language is written or spoken.
Function How does it work?	Everything has a purpose, a role or a way of behaving that can be investigated.	The type of language we use varies depending on the circumstances, purpose, audience and genre.
Causation Why is it like it is?	Things do not just happen. There are causal relationships at work, and actions have consequences.	Language is fundamental to human activity. Many factors affect the development of language.
Change How is it changing?	Change is the process of movement from one state to another. It is universal and inevitable.	Language is not static; it changes constantly.
Connection How is it connected to other things?	We live in a world of interacting systems in which the actions of any individual element affect others.	Language is a major connecting system within, between and among all societies.
Perspective What are the points of view?	Knowledge is moderated by perspectives. Different perspectives lead to different interpretations, understandings and findings. Perspectives may be individual, group, cultural or disciplinary.	Language can be interpreted and expressed in different ways. Literature, in particular, offers cultural, historical and personal perspectives on the world, and invites different interpretations.
Responsibility What is our responsibility?	People make choices based on their understandings, and the actions they take as a result do make a difference.	Language is powerful and can have a profound effect, both positive and negative. Therefore, it must be used responsibly.
Reflection How do we know?	There are different ways of knowing. It is important to reflect on our conclusions, to consider our methods of reasoning, and the quality and reliability of the evidence we have considered.	Through language, we can reflect on our experiences and knowledge.

Examples of questions that illustrate the key concepts

The following table provides sample teacher/student questions that illustrate the key concepts, and that may help to structure or frame an inquiry. These examples demonstrate broad, open-ended questioning—requiring investigation, discussion, and a full and considered response—that is essential in an inquiry-led programme.

Concept	Sample teacher/student questions
Form What is it like?	• What are the ways in which stories can be told? • What are the parts of a book? • What languages do the students in our class/school use? • What makes this language unique?
Function How does it work?	• What part does literature play in the development of a culture? • Why do we name things? • How do different languages work? • How do the pictures and text work together?
Causation Why is it like it is?	• What part does language play in cultural identity? • To what extent does language influence thinking styles? • Why does the same language develop differently in different places? • Why did the author write the story in this way?
Change How is it changing?	• How have our languages changed historically? • What has influenced the development of the language of specific disciplines? • How do we use language differently as we grow? • How have other languages and cultures changed our own language?
Connection How is it connected to other things?	• What are the similarities and differences between languages? • What are the origins of names? • How are storytelling traditions linked to culture? • How do our experiences enable us to connect with stories?
Perspective What are the points of view?	• How could knowledge of a language help us to understand the culture? • Why do some books become best-sellers? • Which language do you think is the easiest to learn? • Why is written language different to spoken language?

Concept	Sample teacher/student questions
Responsibility What is our responsibility?	• How can the use of language influence people? • How should we treat people who speak different languages from us? • Why are we not allowed to read some books or websites? • What responsibility does the author have to avoid bias and stereotyping?
Reflection How do we know?	• How can literature help us to understand a culture? • What kind of messages do authors try to convey to readers? • How well have I "painted a picture with words" in my story? • How do illustrations add to our understanding?

Overall expectations in language

Acknowledging that learning language is a developmental process, the *Language scope and sequence* (2009) presents a set of developmental continuums that are designed as diagnostic tools to assist teachers in planning language learning experiences for students, and in monitoring students' development throughout the primary years. Consideration of the range of language learning situations that exist in PYP schools is reflected in this document. It is intended to inform and support all teachers, as all teachers are teachers of language.

The four language continuums in the *Language scope and sequence* (2009) have been organized into five developmental **phases** with each phase building upon and complementing the previous one. These phases have not been named in order to avoid the value judgment implied in labelling a learner as "developing" or "proficient", for example. The continuums make explicit the **conceptual understandings** that need to be developed at each phase. Evidence of these understandings is described in the behaviours or **learning outcomes** associated with each phase. For example, a 9 year old with well-developed mother-tongue ability may quickly show evidence of some—but not all—of the learning outcomes identified in the early phases when moving into a new language of instruction; a child beginning school at age 3 may spend several years consolidating understanding to demonstrate consistently the learning outcomes identified in the initial phase.

The scope and sequence also identifies the overall expectations considered appropriate in the PYP. These expectations (outlined here) are not a requirement of the programme. However, schools need to be mindful of practice C1.23 in the IB *Programme standards and practices* (2005) that states "If the school adapts, or develops, its own scope and sequence documents for each PYP subject area, the level of overall expectation regarding student achievement expressed in these documents at least matches that expressed in the PYP scope and sequence documents." To arrive at such a judgment, and given that the overall expectations in the *Language scope and sequence* (2009) are presented as broad generalities, it is recommended that the entire document be read and considered.

Oral language—listening and speaking

Phase 1

Learners show an understanding of the value of speaking and listening to communicate. They recognize that sounds are associated with objects, or with symbolic representations of them. They are using language to name their environment, to get to know each other, to initiate and explore relationships, to question and inquire.

Phase 2

Learners show an understanding that sounds are associated with objects, events and ideas, or with symbolic representations of them. They are aware that an object or symbol may have different sounds or words associated with it in different languages. They are beginning to be cognizant about the high degree of variability of language and its uses.

Phase 3

Learners show an understanding of the wide range of purposes of spoken language: that it instructs, informs, entertains, reassures; that each listener's perception of what they hear is unique. They are compiling rules about the use of different aspects of language.

Phase 4

Learners show an understanding of the conventions associated with speaking and listening and the value of adhering to those conventions. They are aware that language is a vehicle for becoming knowledgeable; for negotiating understanding; and for negotiating the social dimension.

Phase 5

Learners are able to understand the difference between literal and figurative language; how to use language differently for different purposes. They are aware that they are building on their previous experiences and using language to construct new meaning.

Visual language—viewing and presenting

Phase 1

Learners show an understanding that the world around them is full of visual language that conveys meaning. They are able to interpret and respond to visual texts. Although much of their own visual language is spontaneous, they are extending and using visual language in more purposeful ways.

Phase 2

Learners identify, interpret and respond to a range of visual text prompts and show an understanding that different types of visual texts serve different purposes. They use this knowledge to create their own visual texts for particular purposes.

Phase 3

Learners show an understanding that visual text may represent reality or fantasy. They recognize that visual text resources can provide factual information and increase understanding. They use visual text in a reflective way to enrich their storytelling or presentations, and to organize and represent information.

Phase 4

Learners show an open-mindedness about the use of a range of visual text resources to access information. They think critically, and are articulate about the use of visual text to influence the viewer. They are able to use visual imagery to present factual information, or to tell a story.

Phase 5

Through inquiry, learners engage with an increasing range of visual text resources. As well as exploring the viewing and presenting strategies that are a part of the planned learning environment, they select and use strategies that suit their learning styles. They are able to make connections between visual imagery and social commentary. They show more discernment in selecting information they consider reliable. They are able to use visual imagery to support a position.

Written language—reading

Phase 1

Learners show an understanding that print represents the real or the imagined world. They know that reading gives them knowledge and pleasure; that it can be a social activity or an individual activity. They have a concept of a "book", and an awareness of some of its structural elements. They use visual cues to recall sounds and the words they are "reading" to construct meaning.

Phase 2

Learners show an understanding that language can be represented visually through codes and symbols. They are extending their data bank of printed codes and symbols and are able to recognize them in new contexts. They understand that reading is a vehicle for learning, and that the combination of codes conveys meaning.

Phase 3

Learners show an understanding that text is used to convey meaning in different ways and for different purposes—they are developing an awareness of context. They use strategies, based on what they know, to read for understanding. They recognize that the structure and organization of text conveys meaning.

Phase 4

Learners show an understanding of the relationship between reading, thinking and reflection. They know that reading is extending their world, both real and imagined, and that there is a reciprocal relationship between the two. Most importantly, they have established reading routines and relish the process of reading.

Phase 5

Learners show an understanding of the strategies authors use to engage them. They have their favourite authors and can articulate reasons for their choices. Reading provides a sense of accomplishment, not only in the process, but in the access it provides them to further knowledge about, and understanding of, the world.

Written language—writing

Phase 1

Learners show an understanding that writing is a form of expression to be enjoyed. They know that how you write and what you write conveys meaning; that writing is a purposeful act, with both individual and collaborative aspects.

Phase 2

Learners show an understanding that writing is a means of recording, remembering and communicating. They know that writing involves the use of codes and symbols to convey meaning to others; that writing and reading uses the same codes and symbols. They know that writing can describe the factual or the imagined world.

Phase 3

Learners show an understanding that writing can be structured in different ways to express different purposes. They use imagery in their stories to enhance the meaning and to make it more enjoyable to write and read. They understand that writing can produce a variety of responses from readers. They can tell a story and create characters in their writing.

Phase 4

Learners show an understanding of the role of the author and are able to take on the responsibilities of authorship. They demonstrate an understanding of story structure and are able to make critical judgments about their writing, and the writing of others. They are able to rewrite to improve the quality of their writing.

Phase 5

Learners show an understanding of the conventions pertaining to writing, in its different forms, that are widely accepted. In addition, they demonstrate a high level of integration of the strands of language in order to create meaning in a manner that suits their learning styles. They can analyse the writing of others and identify common or recurring themes or issues. They accept feedback from others.

Mathematics in the Primary Years Programme

Beliefs and values in mathematics

> All students deserve an opportunity to understand the power and beauty of mathematics.
>
> *Principles and standards for school mathematics*
> National Council of Teachers of Mathematics (NCTM 2000)

In the PYP, mathematics is viewed primarily as a vehicle to support inquiry, providing a global language through which we make sense of the world around us. It is intended that students become competent users of the language of mathematics, and can begin to use it as a way of thinking, as opposed to seeing it as a series of facts and equations to be memorized. The power of mathematics for describing and analysing the world around us is such that it has become a highly effective tool for solving problems.

It is also recognized that students can appreciate the intrinsic fascination of mathematics and explore the world through its unique perceptions. In the same way that students describe themselves as "authors" or "artists", a school's programme should also provide students with the opportunity to see themselves as "mathematicians", where they enjoy and are enthusiastic when exploring and learning about mathematics.

The IB learner profile is integral to teaching and learning mathematics in the PYP because it represents the qualities of effective learners and internationally minded students. The learner profile, together with the five essential elements of the programme—knowledge, concepts, skills, attitudes and action—informs planning, teaching and assessing in mathematics.

Good mathematics practice

It is important that learners acquire mathematical understanding by constructing their own meaning through ever-increasing levels of abstraction, starting with exploring their own personal experiences, understandings and knowledge. Additionally, it is fundamental to the philosophy of the PYP that, since it is to be used in real-life situations, mathematics needs to be taught in relevant, realistic contexts, rather than by attempting to impart a fixed body of knowledge directly to students. How children learn mathematics can be described using the following stages (see figure 22).

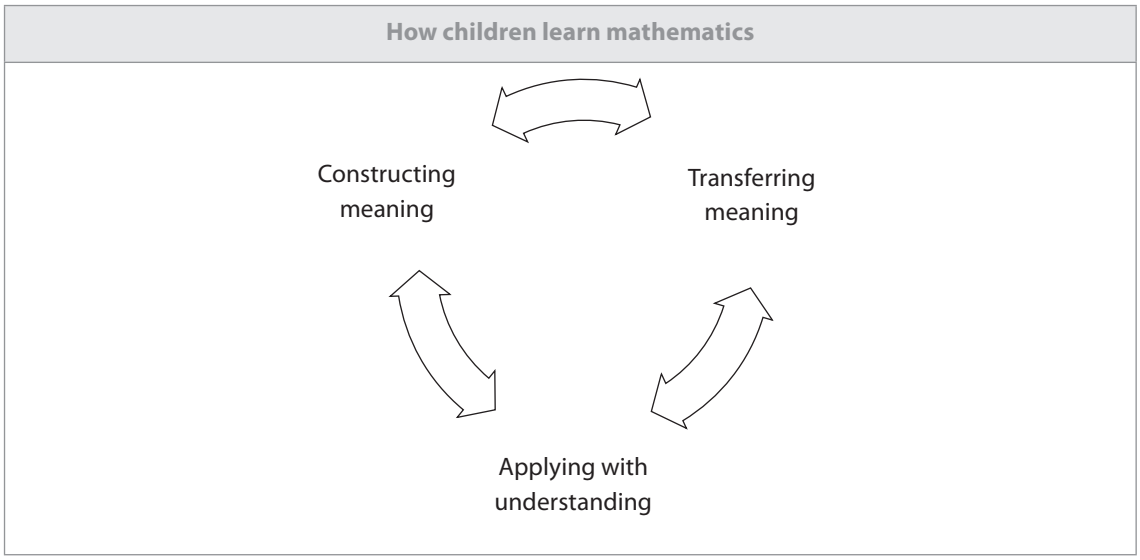

Figure 22

It is useful to consider these stages when planning developmentally appropriate learning experiences at all ages. Schools that have local and/or national curriculum requirements in mathematics should articulate how best these can be incorporated into their planning, teaching and assessing of mathematics.

Constructing meaning about mathematics

Learners construct meaning based on their previous experiences and understanding, and by reflecting upon their interactions with objects and ideas. Therefore, involving learners in an active learning process, where they are provided with possibilities to interact with manipulatives and to engage in conversations with others, is paramount to this stage of learning mathematics.

When making sense of new ideas all learners either interpret these ideas to conform to their present understanding or they generate a new understanding that accounts for what they perceive to be occurring. This construct will continue to evolve as learners experience new situations and ideas, have an opportunity to reflect on their understandings and make connections about their learning.

Transferring meaning into symbols

Only when learners have constructed their ideas about a mathematical concept should they attempt to transfer this understanding into symbols. Symbolic notation can take the form of pictures, diagrams, modelling with concrete objects and mathematical notation. Learners should be given the opportunity to describe their understanding using their own method of symbolic notation, then learning to transfer them into conventional mathematical notation.

Applying with understanding

Applying with understanding can be viewed as the learners demonstrating and acting on their understanding. Through authentic activities, learners should independently select and use appropriate symbolic notation to process and record their thinking. These authentic activities should include a range of practical hands-on problem-solving activities and realistic situations that provide the opportunity to demonstrate mathematical thinking through presented or recorded formats. In this way, learners are able to apply their understanding of mathematical concepts as well as utilize mathematical skills and knowledge.

As they work through these stages of learning, students and teachers use certain processes of mathematical reasoning.

- They use patterns and relationships to analyse the problem situations upon which they are working.
- They make and evaluate their own and each other's ideas.
- They use models, facts, properties and relationships to explain their thinking.
- They justify their answers and the processes by which they arrive at solutions.

In this way, students validate the meaning they construct from their experiences with mathematical situations. By explaining their ideas, theories and results, both orally and in writing, they invite constructive feedback and also lay out alternative models of thinking for the class. Consequently, all benefit from this interactive process.

Play and exploration have a vital role in the learning and application of mathematical knowledge, particularly for younger students. In a PYP learning environment, mathematics skills and activities need to occur in authentic settings. As educators, we need to provide a variety of areas and resources to allow students to encounter situations that will introduce and develop these skills. In this environment, students will be actively involved in a range of activities that can be free or directed. In planning the learning environment and experiences, teachers need to consider that young students may need to revisit areas and skills many times before understanding can be reached. Applying mathematical skills to real-world tasks supports students' learning.

A PYP teacher's personal knowledge of mathematics is of key importance. What teachers themselves understand shapes which resources they choose, what learning experiences they design and how effectively they teach. The teacher's own interest in, and development of, the subject area is maintained through regular professional development, reading of professional journals and, especially, through regular contact with colleagues who share their commitment to teaching mathematics through inquiry. Commercially available resources for teaching mathematics are carefully evaluated to ensure that they meet the needs of the teacher and the students, and the requirements of the programme.

Students and teachers should use the eight key concepts and related questions (presented later in this section) to guide their inquiries. Examples of how to do this can be found in the PYP *Mathematics scope and sequence* (2009). Teachers should regard these as prompts for developing suitable activities to address the mathematics skills and concepts required.

The role of mathematics in the programme of inquiry

Wherever possible, mathematics should be taught through the relevant, realistic context of the units of inquiry. The direct teaching of mathematics in a unit of inquiry may not always be feasible but, where appropriate, introductory or follow-up activities may be useful to help students make connections between the different aspects of the curriculum. Students also need opportunities to identify and reflect on "big ideas" within and between the different strands of mathematics, the programme of inquiry and other subject areas.

Links to the transdisciplinary themes should be explicitly made, whether or not the mathematics is being taught within the programme of inquiry. A developing understanding of these links will contribute to the students' understanding of mathematics in the world and to their understanding of the transdisciplinary theme. The role of inquiry in mathematics is important, regardless of whether it is being taught inside or outside the programme of inquiry. However, it should also be recognized that there are occasions when it is preferable for students to be given a series of strategies for learning mathematical skills in order to progress in their mathematical understanding rather than struggling to proceed.

Examples of completed planners and a flow chart of possible planning processes for mathematics can be found in the *Mathematics scope and sequence* (2009).

How mathematics practices are changing

Structured, purposeful inquiry is the main approach to teaching and learning mathematics in the PYP. However, it is recognized that many educational innovations (or, more accurately, educational reworkings) suffer from the advocacy of a narrow, exclusive approach. The PYP represents an approach to teaching that is broad and inclusive in that it provides a context within which a wide variety of teaching strategies and styles can be accommodated, provided that they are driven by a spirit of inquiry and a clear sense of purpose.

The degree of change needed to teach mathematics in this way will depend on the individual teacher. For those teachers who have grown weary of imposed change for which they see little point, it should be stressed that teachers are not expected to discard years of hard-earned skill and experience in favour of someone else's ideas on good teaching. It is suggested, rather, that teachers engage in reflection on their own practice, both individually and in collaboration with colleagues, with a view to sharing ideas and strengths, and with the primary aim of improving their teaching to improve student learning. In doing so, they will be modelling the skills and attitudes that have been identified as essential for students.

As an aid to reflection, the following set of subject-specific examples of good practice has been produced. It is believed that these examples are worthy of consideration by anyone committed to continuous improvement.

How are mathematics practices changing?	
Increased emphasis on:	**Decreased emphasis on:**
connecting mathematical concepts and applications to learning	treating mathematics as isolated concepts and facts
manipulatives, to make mathematics understandable to students	rote learning, memorization and symbol manipulation
real-life problem solving using mathematics	word problems as problem solving
instruction built on what students know, what they want to know, and how they best might find out	instruction focused on what students do not know
a variety of strategies for possible multiple solutions—emphasis on process	one answer, one method, emphasis on answer
students being encouraged to speculate and pursue hunches	the teacher as the sole authority for right answers
a broad range of topics regardless of computational skills	computational mastery before moving on to other topics
mathematics as a means to an end	teaching mathematics disconnected from other learning
the use of calculators and computers for appropriate purposes	a primary emphasis on pencil and paper computations
programme of inquiry as the context for learning	the textbook as the context for learning
students investigating, questioning, discussing, justifying and journalling their mathematics	the use of worksheets
students and teachers engaged in mathematical discourse.	teacher telling about mathematics.

Knowledge and skills in mathematics

The mathematics component of the curriculum of the PYP encompasses measurement, shape and number, and their many applications to students' everyday lives. Mathematics provides opportunities for students to engage in investigations into measurement, shape and number, and allows them to communicate in a language that is concise and unambiguous. Mathematics concepts and skills can also be applied to solve a variety of real-life problems. Students apply their mathematical reasoning to a number of situations in order to find an appropriate answer to the problems they wish to solve.

In the PYP, the mathematics component of the curriculum should be driven by concepts and skills rather than by content. The key concepts identified in the "Concepts: what do we want students to understand?" section are inevitably influential in driving the curriculum, but there are many other related mathematics concepts that provide further understanding of the subject area.

The *Mathematics scope and sequence* (2009) document identifies the expectations considered appropriate in the PYP. Within each of these interconnected strands, there should be a balance between the acquisition of knowledge and skills and the development of conceptual understanding. The mathematics knowledge component is arranged into five strands: **data handling, measurement, shape and space, pattern and function** and **number**.

In the pattern and function and number strands, students and teachers inquire into number systems and their operations, patterns and functions. They become fluent users of the language of mathematics as they learn to understand its meanings, symbols and conventions.

Data handling, measurement and shape and space are the areas of mathematics that other disciplines use to research, describe, represent and understand aspects of their domain. Mathematics provides the models, systems and processes for handling data, making and comparing measurements, and solving spatial problems. These three strands are, therefore, best studied in authentic contexts provided by the transdisciplinary units of inquiry.

All curriculum areas provide an opportunity to utilize the transdisciplinary skills identified in figure 8 in the "Skills: what do we want students to be able to do?" section. The mathematics component of the curriculum also provides opportunities for students to:

- count, sort, match and compare objects, shapes and numbers
- recognize and continue patterns (and relationships)
- use mathematical vocabulary and symbols (including informal mathematics)
- develop and implement/trial strategies for investigating a range of mathematical questions or problems
- select and use appropriate mathematics (operations, computations and units) to solve numerical and word problems
- make reasonable estimates
- analyse, make predictions and infer from data
- become confident and competent users of ICT in mathematics learning.

Mathematics strands

What do we want students to know?

Data handling

Data handling allows us to make a summary of what we know about the world and to make inferences about what we do not know.

- Data can be collected, organized, represented and summarized in a variety of ways to highlight similarities, differences and trends; the chosen format should illustrate the information without bias or distortion.
- Probability can be expressed qualitatively by using terms such as "unlikely", "certain" or "impossible". It can be expressed quantitatively on a numerical scale.

Measurement

To measure is to attach a number to a quantity using a chosen unit. Since the attributes being measured are continuous, ways must be found to deal with quantities that fall between numbers. It is important to know how accurate a measurement needs to be or can ever be.

Shape and space

The regions, paths and boundaries of natural space can be described by shape. An understanding of the interrelationships of shape allows us to interpret, understand and appreciate our two-dimensional (2D) and three-dimensional (3D) world.

Pattern and function

To identify pattern is to begin to understand how mathematics applies to the world in which we live. The repetitive features of patterns can be identified and described as generalized rules called "functions". This builds a foundation for the later study of algebra.

Number

Our number system is a language for describing quantities and the relationships between quantities. For example, the value attributed to a digit depends on its place within a base system.

Numbers are used to interpret information, make decisions and solve problems. For example, the operations of addition, subtraction, multiplication and division are related to one another and are used to process information in order to solve problems. The degree of precision needed in calculating depends on how the result will be used.

Related concepts: There are many related concepts that could provide further links to the transdisciplinary programme of inquiry or further understanding of the subject area. Related concepts, such as pattern, boundaries and base systems, have been embedded into the descriptions for each of the strands above. Schools may choose to develop further related concepts.

Key concepts in the PYP: what do we want students to understand about mathematics?

Central to the philosophy of the PYP is the principle that purposeful, structured inquiry is a powerful vehicle for learning that promotes meaning and understanding, and challenges students to engage with significant ideas. Hence in the PYP there is also a commitment to a **concept-driven curriculum** as a means of supporting that inquiry. There are clusters of ideas that can usefully be grouped under a set of overarching concepts, each of which has major significance within and across disciplines, regardless of time or place.

These key concepts are one of the essential elements of the PYP framework. It is accepted that these are not, in any sense, the only concepts worth exploring. Taken together they form a powerful curriculum component that drives the teacher- and/or student-constructed inquiries that lie at the heart of the PYP curriculum.

When viewed as a set of questions, the concepts form a research tool that is manageable, open-ended and more readily accessible to students. It is these questions, used flexibly by teachers and students when planning an inquiry-based unit, that shape that unit, giving it direction and purpose.

The following table explains each concept from both the generic perspective and the mathematics perspective; a full explanation of the key concepts is found in the "Concepts: what do we want students to understand?" section.

Concept	Generic perspective	Mathematics perspective
Form What is it like?	Everything has a form with recognizable features that can be observed, identified, described and categorized.	The recognition, categorization and description of patterns throughout the curriculum.
Function How does it work?	Everything has a purpose, a role or a way of behaving that can be investigated.	The examination of systems, relationships, mechanics, components and patterns.
Causation Why is it like it is?	Things do not just happen. There are causal relationships at work, and actions have consequences.	An examination of the mathematical concepts and processes that influence the way things are.
Change How is it changing?	Change is the process of movement from one state to another. It is universal and inevitable.	Looking for evidence of change, analysing the evidence, drawing conclusions and making predictions.
Connection How is it connected to other things?	We live in a world of interacting systems in which the actions of any individual element affect others.	The examination of systems and strategies to identify different kinds and levels of relationships, within and between different strands of mathematics and beyond to other subject areas.

Concept	Generic perspective	Mathematics perspective
Perspective What are the points of view?	Knowledge is moderated by perspectives. Different perspectives lead to different interpretations, understandings and findings. Perspectives may be individual, group, cultural or disciplinary.	The examination of different ways individuals and cultures use mathematics to solve problems. Developing respect for varied interpretations, explanations, strategies and solutions.
Responsibility What is our responsibility?	People make choices based on their understandings, and the actions they take as a result do make a difference.	Understanding the importance of communicating accurately and appreciating the obligation to apply mathematics with honesty.
Reflection How do we know?	There are different ways of knowing. It is important to reflect on our conclusions, to consider our methods of reasoning, and the quality and reliability of the evidence we have considered.	Being able to communicate how we have come to understand an idea, concept or skill. Being able to evaluate the effectiveness of strategies and tools used in order to inform future learning.

Examples of questions that illustrate the key concepts

The following table provides sample teacher/student questions that illustrate the key concepts, and that may help to structure or frame an inquiry. These examples demonstrate broad, open-ended questioning—requiring investigation, discussion, and a full and considered response—that is essential in an inquiry-led programme.

Concept	Sample teacher/student questions
Form What is it like?	• What is a pattern? • How can we describe these shapes? • What is a fraction? • How can we describe time?
Function How does it work?	• How does the scale on a graph work? • What happens if we keep adding? • What is each shape being used for? • How can we record time?
Causation Why is it like it is?	• Why is a block the best shape for building a tower? • Why do these calculations produce patterns? • What prompted people to develop a place value system? • Why was the data displayed in this form?

Concept	Sample teacher/student questions
Change How is it changing?	• How can we convert from the 12-hour clock to the 24-hour clock? • How can you change one quadrilateral into another? • What do all patterns have in common? • What would happen to the area of something if … ?
Connection How is it connected to other things?	• How can you use fractions to explain musical notation? • How are 4 + 3 and 3 + 4 connected? • What do you already know that helps you to read and interpret this display of data? • How is area connected to perimeter?
Perspective What are the points of view?	• Are there some different ways of explaining this? • Who might be interested in, or be able to use, the results of our survey? • How do people calculate in different cultures? • What would make this game fair to all players?
Responsibility What is our responsibility?	• What makes your answer reasonable? • Why does the measurement need to be accurate? • How have you collected all the relevant data?
Reflection How do we know?	• How do you know that you are correct? • Which way works the best? Why? • What could you do differently if you repeated the survey? • Why are our estimates realistic?

Overall expectations in mathematics

The *Mathematics scope and sequence* (2009) has been designed in recognition that learning mathematics is a developmental process and that the phases a learner passes through are not always linear or age related. For this reason the content is presented in continuums for each of the five **strands** of mathematics—data handling, measurement, shape and space, pattern and function, and number. The content of each continuum has been organized into four **phases** of development, with each phase building upon and complementing the previous phase. The continuums make explicit the **conceptual understandings** that need to be developed at each phase. Evidence of these understandings is described in the behaviours or **learning outcomes** associated with each phase and these learning outcomes relate specifically to mathematical concepts, knowledge and skills. Additionally, the learning outcomes have been written to reflect the stages a learner goes through when developing conceptual understanding in mathematics—**constructing meaning, transferring meaning into symbols** and **applying with understanding** (see figure 22).

The scope and sequence also identifies the overall expectations considered appropriate in the PYP. These overall expectations (outlined here) are not a requirement of the programme. However, schools need to be mindful of practice C1.23 in the IB *Programme standards and practices* (2005) that states "If the school adapts, or develops, its own scope and sequence documents for each PYP subject area, the level of overall expectation regarding student achievement expressed in these documents at least matches that expressed in the PYP scope and sequence documents." To arrive at such a judgment, and given that the

overall expectations in the *Mathematics scope and sequence* (2009) are presented as broad generalities, it is recommended that schools undertake a careful consideration of their own scope and sequence document in order to identify the overall expectations in mathematics for their students.

Data handling

Phase 1

Learners will develop an understanding of how the collection and organization of information helps to make sense of the world. They will sort, describe and label objects by attributes and represent information in graphs including pictographs and tally marks. The learners will discuss chance in daily events.

Phase 2

Learners will understand how information can be expressed as organized and structured data and that this can occur in a range of ways. They will collect and represent data in different types of graphs, interpreting the resulting information for the purpose of answering questions. The learners will develop an understanding that some events in daily life are more likely to happen than others and they will identify and describe likelihood using appropriate vocabulary.

Phase 3

Learners will continue to collect, organize, display and analyse data, developing an understanding of how different graphs highlight different aspects of data more efficiently. They will understand that scale can represent different quantities in graphs and that mode can be used to summarize a set of data. The learners will make the connection that probability is based on experimental events and can be expressed numerically.

Phase 4

Learners will collect, organize and display data for the purposes of valid interpretation and communication. They will be able to use the mode, median, mean and range to summarize a set of data. They will create and manipulate an electronic database for their own purposes, including setting up spreadsheets and using simple formulas to create graphs. Learners will understand that probability can be expressed on a scale (0–1 or 0%–100%) and that the probability of an event can be predicted theoretically.

Measurement

Phase 1

Learners will develop an understanding of how measurement involves the comparison of objects and the ordering and sequencing of events. They will be able to identify, compare and describe attributes of real objects as well as describe and sequence familiar events in their daily routine.

Phase 2

Learners will understand that standard units allow us to have a common language to measure and describe objects and events, and that while estimation is a strategy that can be applied for approximate measurements, particular tools allow us to measure and describe attributes of objects and events with more accuracy. Learners will develop these understandings in relation to measurement involving length, mass, capacity, money, temperature and time.

Phase 3

Learners will continue to use standard units to measure objects, in particular developing their understanding of measuring perimeter, area and volume. They will select and use appropriate tools and units of measurement, and will be able to describe measures that fall between two numbers on a scale. The learners will be given the opportunity to construct meaning about the concept of an angle as a measure of rotation.

Phase 4

Learners will understand that a range of procedures exists to measure different attributes of objects and events, for example, the use of formulas for finding area, perimeter and volume. They will be able to decide on the level of accuracy required for measuring and using decimal and fraction notation when precise measurements are necessary. To demonstrate their understanding of angles as a measure of rotation, the learners will be able to measure and construct angles.

Shape and space

Phase 1

Learners will understand that shapes have characteristics that can be described and compared. They will understand and use common language to describe paths, regions and boundaries of their immediate environment.

Phase 2

Learners will continue to work with 2D and 3D shapes, developing the understanding that shapes are classified and named according to their properties. They will understand that examples of symmetry and transformations can be found in their immediate environment. Learners will interpret, create and use simple directions and specific vocabulary to describe paths, regions, positions and boundaries of their immediate environment.

Phase 3

Learners will sort, describe and model regular and irregular polygons, developing an understanding of their properties. They will be able to describe and model congruency and similarity in 2D shapes. Learners will continue to develop their understanding of symmetry, in particular reflective and rotational symmetry. They will understand how geometric shapes and associated vocabulary are useful for representing and describing objects and events in real-world situations.

Phase 4

Learners will understand the properties of regular and irregular polyhedra. They will understand the properties of 2D shapes and understand that 2D representations of 3D objects can be used to visualize and solve problems in the real world, for example, through the use of drawing and modelling. Learners will develop their understanding of the use of scale (ratio) to enlarge and reduce shapes. They will apply the language and notation of bearing to describe direction and position.

Pattern and function

Phase 1

Learners will understand that patterns and sequences occur in everyday situations. They will be able to identify, describe, extend and create patterns in various ways.

Phase 2

Learners will understand that whole numbers exhibit patterns and relationships that can be observed and described, and that the patterns can be represented using numbers and other symbols. As a result, learners will understand the inverse relationship between addition and subtraction, and the associative and commutative properties of addition. They will be able to use their understanding of pattern to represent and make sense of real-life situations and, where appropriate, to solve problems involving addition and subtraction.

Phase 3

Learners will analyse patterns and identify rules for patterns, developing the understanding that functions describe the relationship or rules that uniquely associate members of one set with members of another

set. They will understand the inverse relationship between multiplication and division, and the associative and commutative properties of multiplication. They will be able to use their understanding of pattern and function to represent and make sense of real-life situations and, where appropriate, to solve problems involving the four operations.

Phase 4

Learners will understand that patterns can be represented, analysed and generalized using algebraic expressions, equations or functions. They will use words, tables, graphs and, where possible, symbolic rules to analyse and represent patterns. They will develop an understanding of exponential notation as a way to express repeated products, and of the inverse relationship that exists between exponents and roots. The students will continue to use their understanding of pattern and function to represent and make sense of real-life situations and to solve problems involving the four operations.

Number

Phase 1

Learners will understand that numbers are used for many different purposes in the real world. They will develop an understanding of one-to-one correspondence and conservation of number, and be able to count and use number words and numerals to represent quantities.

Phase 2

Learners will develop their understanding of the base 10 place value system and will model, read, write, estimate, compare and order numbers to hundreds or beyond. They will have automatic recall of addition and subtraction facts and be able to model addition and subtraction of whole numbers using the appropriate mathematical language to describe their mental and written strategies. Learners will have an understanding of fractions as representations of whole-part relationships and will be able to model fractions and use fraction names in real-life situations.

Phase 3

Learners will develop the understanding that fractions and decimals are ways of representing whole-part relationships and will demonstrate this understanding by modelling equivalent fractions and decimal fractions to hundredths or beyond. They will be able to model, read, write, compare and order fractions, and use them in real-life situations. Learners will have automatic recall of addition, subtraction, multiplication and division facts. They will select, use and describe a range of strategies to solve problems involving addition, subtraction, multiplication and division, using estimation strategies to check the reasonableness of their answers.

Phase 4

Learners will understand that the base 10 place value system extends infinitely in two directions and will be able to model, compare, read, write and order numbers to millions or beyond, as well as model integers. They will develop an understanding of ratios. They will understand that fractions, decimals and percentages are ways of representing whole-part relationships and will work towards modelling, comparing, reading, writing, ordering and converting fractions, decimals and percentages. They will use mental and written strategies to solve problems involving whole numbers, fractions and decimals in real-life situations, using a range of strategies to evaluate reasonableness of answers.

Science in the Primary Years Programme

Beliefs and values in science

> Learning in science is fundamental to understanding the world in which we live and work.
>
> *Science in the New Zealand Curriculum*, Ministry of Education (1997)

In the PYP, science is viewed as the exploration of the biological, chemical and physical aspects of the natural world, and the relationships between them. Our understanding of science is constantly changing and evolving. The inclusion of science within the PYP leads learners to an appreciation and awareness of the world as it is viewed from a scientific perspective. It encourages curiosity and ingenuity and enables the student to develop an understanding of the world. Reflection on scientific knowledge also helps students to develop a sense of responsibility regarding the impact of their actions on themselves, others and their world. Inquiry is central to scientific investigation and understanding. Students actively construct and challenge their understanding of the world around them by combining scientific knowledge with reasoning and thinking skills. Scientific knowledge is made relevant through its innumerable applications in the real world. The science process, by encouraging hands-on experience and inquiry, enables the individual to make informed and responsible decisions, not only in science but also in other areas of life.

The importance of science in an international curriculum is recognized as universal and transcends the boundaries of gender, cultural, linguistic and national biases. The inclusion of science within the curriculum develops an understanding of, and competence in using, the facilities of a rapidly changing scientific and technological world while gaining a positive image of science and its contribution to the quality of life today. It also involves the development of an appreciation for the scientific contributions of people from various cultures and backgrounds.

The IB learner profile is integral to teaching and learning science in the PYP because it represents the qualities of effective learners and internationally minded students. The learner profile, together with the five essential elements of the programme—knowledge, concepts, skills, attitudes and action—informs planning, teaching and assessing in science.

Good science practice

Science can be used to provide explanations and models of behaviour for phenomena and objects around us. It can also be used to investigate the interrelationships between the biological, chemical and physical worlds. The science component of the curriculum is considered to be driven by concepts and skills rather than by content. Science should be viewed as a way of thinking and as a process that strives for balance between the construction of meaning and the acquisition of knowledge and skills.

There is no single right way to plan scientific inquiry. Teachers should provide a range of opportunities and situations for students to investigate, and then guide them to make their investigations more effectual. These opportunities and situations should include a variety of external resources and settings, as well as classroom-based work.

Structured, purposeful inquiry is the way in which students learn best, and the starting point should always be students' prior and current understanding. Students should be invited to investigate science by formulating their own questions, looking at the various means available to answer these questions, and proceeding with research, experimentation, observation and other means that will lead them to their own responses to the questions. The goal is the active construction of meaning that is achieved by building connections between a student's experience and the information and processes derived from the inquiry into new content.

It is suggested that the teacher's role in this process is to create an educational environment that encourages students to take responsibility, to the greatest possible extent, for their own science learning. This means that resources must be provided for each student to become involved in self-initiated inquiry.

In the PYP classroom, the teacher facilitates the process of students becoming initiators rather than followers by asking carefully thought out, open-ended questions, and by encouraging students to ask questions of each other as well as of the teacher. The teacher must also model and value inquiry.

Teachers can use the eight key concepts and related questions (presented later in this section) to guide their own inquiry. By engaging in inquiry themselves, teachers will not only achieve a deeper understanding of the scientific issues involved, but will also be a model for their students by assuming the role of "teacher as learner".

A PYP teacher's personal knowledge of science is of key importance. What teachers themselves understand shapes which resources they choose, what learning experiences they design and how effectively they teach. The teacher's own interest in, and development of, the subject area is maintained through regular professional development, reading of professional journals and, especially, through regular contact with colleagues who share their commitment to teaching science through inquiry. Commercially available resources for teaching science are carefully evaluated to ensure that they meet the needs of the teacher and the students, and the requirements of the programme.

The role of science in the programme of inquiry

It is recognized that teaching and learning science as a subject, while necessary, is not sufficient. Of equal importance is the need to learn science in context, exploring content relevant to students, and transcending the boundaries of the traditional subject area. The transdisciplinary themes provide the framework for a highly defined, focused, in-depth programme of inquiry, and as science is relevant to all the transdisciplinary themes, all planned science learning should take place within this framework. In return, the science knowledge and the application of that knowledge will enhance inquiries into the central ideas defined by the transdisciplinary themes.

It is worthwhile to note that there will be occasions that present themselves for student-initiated, spontaneous science inquiries that are not directly related to any planned units of inquiry. These are valuable teaching and learning experiences in themselves and they provide teachers and students with the opportunity to apply the pedagogy of the PYP to authentic, of-the-moment situations. Schools that have local and/or national curriculum requirements in science should articulate how best this predetermined knowledge (or skills) can be incorporated into their programme of inquiry to the fullest possible extent. They will need to plan how students can be encouraged to think scientifically, and promote this way of working throughout the curriculum and not just in the programme of inquiry.

If successful learning in science has taken place, students should be able to select key ideas and significant understanding from the data acquired for a unit of inquiry. They should be able to frame genuine, open-ended questions worthy of sustained research. As they conduct their inquiries, they should be able to provide accurate information and valid explanations. They should be able to identify the possible causes of an issue, choose a solution, and determine appropriate action to be taken. A willingness and ability to take action demonstrates evidence of learning. Through these processes, students should develop the habits and attitudes of successful lifelong learners.

How science practices are changing

Structured, purposeful inquiry is the main approach to teaching and learning science in the PYP. However, it is recognized that many educational innovations (or, more accurately, educational reworkings) suffer from the advocacy of a narrow, exclusive approach. The PYP represents an approach to teaching that is broad and inclusive in that it provides a context within which a wide variety of teaching strategies and styles can be accommodated, provided that they are driven by a spirit of inquiry and a clear sense of purpose.

The degree of change needed to teach science in this way will depend on the individual teacher. For those teachers who have grown weary of imposed change for which they see little point, it should be stressed that teachers are not expected to discard years of hard-earned skill and experience in favour of someone else's ideas on good teaching. It is suggested, rather, that teachers engage in reflection on their own practice, both individually and in collaboration with colleagues, with a view to sharing ideas and strengths, and with the primary aim of improving their teaching to improve student learning. In doing so, they will be modelling the skills and attitudes that have been identified as essential for students.

As an aid to reflection, the following set of subject-specific examples of good practice has been produced. It is believed that these examples are worthy of consideration by anyone committed to continuous improvement.

How are science practices changing?	
Increased emphasis on:	**Decreased emphasis on:**
hands-on learning experiences to ensure that students experience and learn science process skills; high level of student involvement in a flexible learning environment	teacher demonstration and strict adherence to teacher-defined activities and direction of process
units of inquiry that lend themselves to transdisciplinary investigations	science lessons/units in isolation
challenging students to answer open-ended questions with investigations so that they can abandon/modify their misconceptions by observations, measurements or experimentation (teacher as facilitator)	the teacher as the sole authority for the correct answer or for disseminating information (teacher as expert)
a wider and responsible use of technology in all its forms as a tool for science learning	a limited use of technology as a tool for learning science or the teaching of an isolated group of skills
accepting uncertainty and ambiguity or the possibility of more than one acceptable solution/ hypothesis	finding pre-set answers
more than one approach, model or process	one scientific model to approach investigations
discussion, dialogue, elaboration and interpretation of data gathered, with students proposing explanations and conclusions	written recording of data only; collecting and recording data as the sole purpose of an activity
challenging students to find applications for, and take action on, what they have learned	simply learning science facts and skills
instruction that recognizes that process and content are interdependent	separating instruction in scientific process and scientific content

How are science practices changing?	
Increased emphasis on:	**Decreased emphasis on:**
providing students with the opportunities to explore a science interest when it arises	confining science to set times
a concept-driven curriculum using a wide variety of materials and manipulatives.	a textbook-driven curriculum using a limited range of science textbooks.

Knowledge and skills in science

The science area of the PYP encompasses science and its applications. In the PYP, the science component of the curriculum should be driven by concepts and skills rather than by content. The key concepts identified in the "Concepts: what do we want students to understand?" section are inevitably influential in driving the curriculum, but there are many other related science concepts that provide further understanding of the subject area.

When schools develop their programme of inquiry, they should ensure that a breadth and balance of science content is covered through the units of inquiry. The central ideas a school develops should be directly reflected in the school's scope and sequence documents.

The PYP *Science scope and sequence* (2008) aims to provide information for the whole school community about the learning that is going on in science and identifies units of inquiry that could provide authentic opportunities for science learning in the PYP. The central ideas, key concepts, related concepts and lines of inquiry identified in this document are taken from the sample programme of inquiry published in *Developing a transdisciplinary programme of inquiry* (2008), available on the OCC.

In the following "Science strands" section, the knowledge component is arranged into four strands: **living things, Earth and space, materials and matter** and **forces and energy**. The four strands do not need to be taught each year, but there does need to be a balance throughout the programme of inquiry.

In addition to these strands, students will have the opportunity to identify and reflect on "big ideas" by making connections between the questions asked and the concepts that drive the inquiry. They will become aware of the relevance that these concepts have to all of their learning.

In living things, students inquire into issues related to themselves and their environment, while in Earth and space, students extend their inquiry to include the study of planet Earth and its relationship to the universe. The remaining strands, materials and matter and forces and energy, focus on the study of the origins, properties and uses of solids, liquids, gases and energy sources. These strands do not have fixed boundaries; many areas will necessarily overlap with each other and with other subject areas such as mathematics, social studies, and personal, social and physical education (PSPE). Students should be made aware of the inevitable links to other areas of the curriculum in order to understand the interconnected nature of the subject areas, both with one another and with the transdisciplinary themes.

Science provides opportunities for students to engage in scientific investigations by making accurate observations, handling tools, recording and comparing data, and formulating explanations using their own scientific experiences and those of others. Students will gain experience in testing their own assumptions and thinking critically about the perspectives of others in order to develop further their own ideas.

All curriculum areas provide an opportunity to utilize the transdisciplinary skills identified in figure 8 in the "Skills: what do we want students to be able to do?" section. The science component of the curriculum also provides opportunities for students to:

- observe carefully in order to gather data
- use a variety of instruments and tools to measure data accurately
- use scientific vocabulary to explain their observations and experiences
- identify or generate a question or problem to be explored
- plan and carry out systematic investigations, manipulating variables as necessary
- make and test predictions
- interpret and evaluate data gathered in order to draw conclusions
- consider scientific models and applications of these models (including their limitations).

Science strands

What do we want students to know?

Living things

The study of the characteristics, systems and behaviours of humans and other animals, and of plants; the interactions and relationships between and among them, and with their environment.

Related concepts: adaptation, animals, biodiversity, biology, classification, conservation, ecosystems, evolution, genetics, growth, habitat, homeostasis, organism, plants, systems (digestive, nervous, reproductive, respiratory).

Earth and space

The study of planet Earth and its position in the universe, particularly its relationship with the sun; the natural phenomena and systems that shape the planet and the distinctive features that identify it; the infinite and finite resources of the planet.

Related concepts: atmosphere, climate, erosion, evidence, geography, geology, gravity, renewable and non-renewable energy sources, resources, seasons, space, sustainability, systems (solar, water cycle, weather), tectonic plate movement, theory of origin.

Materials and matter

The study of the properties, behaviours and uses of materials, both natural and human-made; the origins of human-made materials and how they are manipulated to suit a purpose.

Related concepts: changes of state, chemical and physical changes, conduction and convection, density, gases, liquids, properties and uses of materials, solids, structures, sustainability.

Forces and energy

The study of energy, its origins, storage and transfer, and the work it can do; the study of forces; the application of scientific understanding through inventions and machines.

Related concepts: conservation of energy, efficiency, equilibrium, forms of energy (electricity, heat, kinetic, light, potential, sound), magnetism, mechanics, physics, pollution, power, technological advances, transformation of energy.

Related concepts: While the key concepts have been identified, related concepts could provide further links to the transdisciplinary programme of inquiry or further understanding of the subject area. Here, examples of some possible related concepts have been provided for each of the strands. Schools may choose to develop their own related concepts.

Key concepts in the PYP: what do we want students to understand about science?

Central to the philosophy of the PYP is the principle that purposeful, structured inquiry is a powerful vehicle for learning that promotes meaning and understanding, and challenges students to engage with significant ideas. Hence in the PYP there is also a commitment to a **concept-driven curriculum** as a means of supporting that inquiry. There are clusters of ideas that can usefully be grouped under a set of overarching concepts, each of which has major significance within and across disciplines, regardless of time or place.

These key concepts are one of the essential elements of the PYP framework. It is accepted that these are not, in any sense, the only concepts worth exploring. Taken together they form a powerful curriculum component that drives the teacher- and/or student-constructed inquiries that lie at the heart of the PYP curriculum.

When viewed as a set of questions, the concepts form a research tool that is manageable, open-ended and more readily accessible to students. It is these questions, used flexibly by teachers and students when planning an inquiry-based unit, that shape that unit, giving it direction and purpose.

The following table explains each concept from both the generic perspective and the science perspective; a full explanation of the key concepts is found in the "Concepts: what do we want students to understand?" section.

Concept	Generic perspective	Science perspective
Form What is it like?	Everything has a form with recognizable features that can be observed, identified, described and categorized.	Most things have a form or shape with an outward or visible manifestation and an internal structure.
Function How does it work?	Everything has a purpose, a role or a way of behaving that can be investigated.	The special activities, properties or purposes, natural or endowed, of a creature or thing.
Causation Why is it like it is?	Things do not just happen. There are causal relationships at work, and actions have consequences.	The effect brought about by an intended or unintended action or reaction.
Change How is it changing?	Change is the process of movement from one state to another. It is universal and inevitable.	The concept of change, also described as transformation, is a pervasive concept in science. Change is an inevitable aspect of the physical world as things become different or pass from one form to another. It can be natural or brought about and accelerated by outside influences.

Concept	Generic perspective	Science perspective
Connection How is it connected to other things?	We live in a world of interacting systems in which the actions of any individual element affect others.	The world is full of interacting systems that depend on each other to form a working whole.
Perspective What are the points of view?	Knowledge is moderated by perspectives. Different perspectives lead to different interpretations, understandings and findings. Perspectives may be individual, group, cultural or disciplinary.	Events and findings can be interpreted differently, depending on knowledge, experience and motives. The difference between empirically proven facts and supposition must be emphasized.
Responsibility What is our responsibility?	People make choices based on their understandings, and the actions they take as a result do make a difference.	We have a responsibility to the world in which we live. This involves being aware of how scientific knowledge can be used to improve or worsen the quality of life of all living things. Responsibility entails action as well as awareness.
Reflection How do we know?	There are different ways of knowing. It is important to reflect on our conclusions, to consider our methods of reasoning, and the quality and reliability of the evidence we have considered.	We must consciously reflect on, and be able to describe, how we gain our knowledge and develop our attitudes.

Examples of questions that illustrate the key concepts

The following table provides sample teacher/student questions that illustrate the key concepts, and that may help to structure or frame an inquiry. These examples demonstrate broad, open-ended questioning—requiring investigation, discussion, and a full and considered response—that is essential in an inquiry-led programme.

Concept	Sample teacher/student questions
Form What is it like?	• What does it feel like? • Where do we get the food we eat? • If the Earth were cut in half between the North Pole and the South Pole, what would it look like on the inside? • What are the components of an ecosystem?
Function How does it work?	• What can you use shadows for? • How do seeds fit into the growth cycle of plants? • How is air being used around us? • What do reservoirs and purification plants do?

Concept	Sample teacher/student questions
Causation Why is it like it is?	• How can you make a shadow? • Why are different foods processed in different ways? • How are houses around the world constructed to suit the local climate? • What causes the changes that occur during puberty?
Change How is it changing?	• How does the sand change from the morning to the afternoon? • What differences do you see in the growth of plants over time? • How do our bodies change when we exercise? • In what ways does air differ from place to place and over time?
Connection How is it connected to other things?	• What link is there between the time of day and the shadow your body makes? • Why are certain vehicles suitable for particular tasks? • How is the human life cycle the same as or different from that of other animals? • What are the similarities and differences between your local ecosystem and a larger ecosystem that you have researched?
Perspective What are the points of view?	• Do plants (or animals) in the classroom need to be taken care of in the same way? Why? • What are the different points of view supported by the evidence? • How does science explain the existence of the Earth, solar system and galaxy? • What are the implications for humans?
Responsibility What is our responsibility?	• What things should we do to care for our classroom plants and animals? • How can we make sure we do not waste water? • What factors do you need to consider when designing and making a vehicle? • What should we do to remain healthy?
Reflection How do we know?	• How will we know when it is time to water the plants? • What do you think happens to your body during exercise and after exercise? • How has space exploration influenced our daily lives? • In what ways can we observe that our bodies are using air?

Overall expectations in science

The *Science scope and sequence* (2008) identifies the overall expectations considered appropriate in the PYP. It does this by looking at the central ideas included in the sample programme of inquiry published in *Developing a transdisciplinary programme of inquiry* (2008) and by identifying the essential understandings and processes being developed within each age range.

These expectations (outlined here) are not a requirement of the programme. However, schools need to be mindful of practice C1.23 in the IB *Programme standards and practices* (2005) that states "If the school adapts, or develops, its own scope and sequence documents for each PYP subject area, the level of overall expectation regarding student achievement expressed in these documents at least matches that expressed in the PYP scope and sequence documents." To arrive at such a judgment, and given that the overall expectations in the *Science scope and sequence* (2008) are presented as broad generalities, it is recommended that schools undertake a careful consideration of their own scope and sequence document in order to identify the overall expectations in science for their students.

3–5 years

Students will develop their observational skills by using their senses to gather and record information, and they will use their observations to identify simple patterns, make predictions and discuss their ideas. They will explore the way objects and phenomena function, and will recognize basic cause and effect relationships. Students will examine change over varying time periods and know that different variables and conditions may affect change. They will be aware of different perspectives, and they will show care and respect for themselves, other living things and the environment. Students will communicate their ideas or provide explanations using their own scientific experience and vocabulary.

5–7 years

Students will develop their observational skills by using their senses to gather and record information, and they will use their observations to identify patterns, make predictions and refine their ideas. They will explore the way objects and phenomena function, identify parts of a system, and gain an understanding of cause and effect relationships. Students will examine change over varying time periods, and will recognize that more than one variable may affect change. They will be aware of different perspectives and ways of organizing the world, and they will show care and respect for themselves, other living things and the environment. Students will communicate their ideas or provide explanations using their own scientific experience.

7–9 years

Students will develop their observational skills by using their senses and selected observational tools. They will gather and record observed information in a number of ways, and they will reflect on these findings to identify patterns or connections, make predictions, and test and refine their ideas with increasing accuracy. Students will explore the way objects and phenomena function, identify parts of a system, and gain an understanding of increasingly complex cause and effect relationships. They will examine change over time, and will recognize that change may be affected by one or more variables. They will examine how products and tools have been developed through the application of science concepts. They will be aware of different perspectives and ways of organizing the world, and they will be able to consider how these views and customs may have been formulated. Students will consider ethical issues in science-related contexts and use their learning in science to plan thoughtful and realistic action in order to improve their welfare and that of other living things and the environment. Students will communicate their ideas or provide explanations using their own scientific experience and that of others.

9–12 years

Students will develop their observational skills by using their senses and selected observational tools. They will gather and record observed information in a number of ways, and they will reflect on these findings to identify patterns or connections, make predictions, and test and refine their ideas with increasing accuracy. Students will explore the way objects and phenomena function, identify parts of a system, and gain an understanding of increasingly complex cause and effect relationships. They will examine change over time, and they will recognize that change may be affected by one or more variables. Students will reflect on the

impact that the application of science, including advances in technology, has had on themselves, society and the environment. They will be aware of different perspectives and ways of organizing the world, and they will be able to consider how these views and customs may have been formulated. Students will examine ethical and social issues in science-related contexts and express their responses appropriately. They will use their learning in science to plan thoughtful and realistic action in order to improve their welfare and that of other living things and the environment. Students will communicate their ideas or provide explanations using their own scientific experience and that of others.

Social studies in the Primary Years Programme

Beliefs and values in social studies

> Social studies education aims to enable students to participate in a changing society as informed, confident, and responsible citizens.
>
> *Social Studies in the New Zealand Curriculum*, Ministry of Education (1997)

In the PYP, social studies is viewed as the study of people in relation to their past, their present and their future, their environment and their society. Social studies encourages curiosity and develops an understanding of a rapidly changing world. Through social studies, students develop an understanding of their personal and cultural identities. They develop the skills and knowledge needed to participate actively in their classroom, their school, their community and the world: to understand themselves in relation to their communities.

The aim of social studies within the PYP is to promote intercultural understanding and respect for individuals and their values and traditions. In support of the IB mission statement, the social studies component of the PYP curriculum will encourage students to "understand that other people, with their differences, can also be right". Therefore, there is a strong emphasis on the reduction of prejudice and discrimination within the classroom, the school, the community and the world.

The IB learner profile is integral to teaching and learning social studies in the PYP because it represents the qualities of effective learners and internationally minded students. The learner profile, together with the five essential elements of the programme—knowledge, concepts, skills, attitudes and action—informs planning, teaching and assessing in social studies.

Social studies learning guides students towards a deeper understanding of themselves and others, and of their place in an increasingly global society. It provides opportunities for students to look at and think about human behaviour and activity realistically, objectively, and with sensitivity. Exposure to and experience with social studies therefore opens doors to key questions about life and learning. Evidence of student learning will be apparent in their willingness and ability to take action in order to make a difference in the world.

Good social studies practice

In the PYP, a wide variety of strategies and learning experiences can be used to teach social studies, but the philosophy and pedagogy of the PYP should inform all planning, teaching and assessment of the subject. Decisions about content in social studies will be dependent on the school's location, context and curriculum requirements. Through relating content to significant and universal concepts common to all societies, times and places, the social studies component of the curriculum becomes international. Social studies teaching and learning takes place within the programme of inquiry.

Structured, purposeful inquiry is the way in which students learn best, and the starting point should always be students' prior and current understanding. Teachers work with colleagues to plan authentic learning experiences that address the central idea and inquiry points of the unit. This collaboration enhances the transdisciplinary nature of the units. Resources are selected on the basis of the multiple perspectives that they present.

Learning that allows for a variety of learning styles and language levels is planned, encouraging students to ask and answer their own questions. Through their interaction with the resources and dialogue with each other, students consider different points of view, develop skills and attitudes, and gain knowledge and conceptual understanding. Students apply skills and concepts in new contexts, and transfer new skills and concepts to familiar contexts.

The social studies component of the curriculum provides opportunities for students to:

- learn how to ask compelling and relevant questions that can be researched
- gain a secure understanding of their own identity and their place in the world
- develop an understanding of other cultural groups and an appreciation of other ideas and beliefs
- gain knowledge that is of genuine importance in understanding the human condition through the exploration of themes that have significance for all students in all cultures
- gain conceptual understanding through participating in learning experiences that foster sensitivity, creativity and initiative, leading to socially responsible action
- gain a sense of time and place in relation to their own experience and the experience of other people
- gain an understanding of humankind's role in, and dependence on, the natural and constructed world, and learn to apply this knowledge in responsible ways.

As a result of their learning, students share with each other and take action. Students and teachers develop and define clear criteria with which the process and product will be assessed.

A PYP teacher's personal knowledge of social studies is of key importance. What teachers themselves understand shapes which resources they choose, what learning experiences they design and how effectively they teach. The teacher's own interest in, and development of, the subject area is maintained through regular professional development, reading of professional journals and, especially, through regular contact with colleagues who share their commitment to teaching social studies through inquiry. Commercially available resources for teaching social studies are carefully evaluated to ensure that they meet the needs of the teacher and the students, and the requirements of the programme.

The role of social studies in the programme of inquiry

It is recognized that teaching and learning social studies as a subject, while necessary, is not sufficient. Of equal importance is the need to learn social studies in context, exploring content relevant to students, and transcending the boundaries of the traditional subject area. The transdisciplinary themes provide the framework for a highly defined, focused, in-depth programme of inquiry, and as social studies is relevant to all the transdisciplinary themes, all planned social studies learning should take place within this framework. In return, the social studies knowledge and the application of that knowledge will enhance inquiries into the central ideas defined by the transdisciplinary themes.

It is worthwhile to note that there will be occasions that present themselves for student-initiated, spontaneous social studies inquiries that are not directly related to any planned units of inquiry. These are valuable teaching and learning experiences in themselves and they provide teachers and students with the opportunity to apply the pedagogy of the PYP to authentic, of-the-moment situations.

Schools that have local and/or national curriculum requirements in social studies should articulate how best this predetermined knowledge (or skills) can be incorporated into their programme of inquiry to the fullest possible extent.

If successful learning in social studies has taken place, students should be able to select key ideas and significant understanding from the data acquired for a unit of inquiry. They should be able to frame genuine, open-ended questions worthy of sustained research. As they conduct their inquiries, they should be able to provide accurate information and valid explanations. They should be able to identify the possible causes of

an issue, choose a solution, and determine appropriate action to be taken. A willingness and ability to take action demonstrates evidence of learning. Through these processes, students should develop the habits and attitudes of successful lifelong learners.

How social studies practices are changing

Structured, purposeful inquiry is the main approach to teaching and learning social studies in the PYP. However, it is recognized that many educational innovations (or, more accurately, educational reworkings) suffer from the advocacy of a narrow, exclusive approach. The PYP represents an approach to teaching that is broad and inclusive in that it provides a context within which a wide variety of teaching strategies and styles can be accommodated, provided that they are driven by a spirit of inquiry and a clear sense of purpose.

The degree of change needed to teach social studies in this way will depend on the individual teacher. For those teachers who have grown weary of imposed change for which they see little point, it should be stressed that teachers are not expected to discard years of hard-earned skill and experience in favour of someone else's ideas on good teaching. It is suggested, rather, that teachers engage in reflection on their own practice, both individually and in collaboration with colleagues, with a view to sharing ideas and strengths, and with the primary aim of improving their teaching to improve student learning. In doing so, they will be modelling the skills and attitudes that have been identified as essential for students.

As an aid to reflection, the following set of subject-specific examples of good practice has been produced. It is believed that these examples are worthy of consideration by anyone committed to continuous improvement.

How are social studies practices changing?	
Increased emphasis on:	**Decreased emphasis on:**
a coherent, articulated school-wide programme of inquiry, based on agreed significant and relevant contents	topics chosen by individual teachers; favourite topics; topics that have always been done in the grade level or that are well resourced
using multiple sources and presenting multiple perspectives (global, social, cultural and gender)	relying on single sources and presenting narrow perspectives (national, religious, political, stereotypical)
planning units of inquiry that lend themselves to transdisciplinary investigations across the areas of the curriculum	planning units based on single disciplines such as history, geography or society
planning units that build in local, multicultural and global dimensions	planning units that focus on Western civilization and the developed world
using a variety of primary social studies sources and documentation (people, artifacts, field trips, surveys and interviews) as well as sources such as media and technology	textbooks and worksheets as the predominant resources in social studies

How are social studies practices changing?	
Increased emphasis on:	**Decreased emphasis on:**
factual information as a vehicle to conceptual development within units of inquiry that focus on students constructing meaning, and expanding and deepening their knowledge and understanding of the world	factual information (such as dates and names of people or countries) as an end in itself
empowering students to be responsible and to take action in our world today.	teaching about responsibility and the need for action in our world today.

Knowledge and skills in social studies

In the PYP, social studies is essentially about people: how they think, feel and act; how they interact with others; their beliefs, aspirations and pleasures; the problems they have to face; how and where they live (or lived); how they interact with their environment; the work they do; and how they organize themselves.

All curriculum areas provide an opportunity to utilize the transdisciplinary skills identified in figure 8 in the "Skills: what do we want students to be able to do?" section. The social studies component of the curriculum also provides opportunities for students to:

- formulate and ask questions about the past, the future, places and society
- use and analyse evidence from a variety of historical, geographical and societal sources
- orientate in relation to place and time
- identify roles, rights and responsibilities in society
- assess the accuracy, validity and possible bias of sources.

The PYP *Social studies scope and sequence* (2008) aims to provide information for the whole school community about the learning that is going on in social studies through the transdisciplinary programme of inquiry. The knowledge component of social studies in the PYP is arranged into five strands: **human systems and economic activities, social organization and culture, continuity and change through time, human and natural environments** and **resources and the environment**. These strands do not have fixed boundaries; many areas will necessarily overlap with each other and with other subject areas such as mathematics, arts, and personal, social and physical education (PSPE). Students should be made aware of the inevitable links to other areas of the curriculum in order to understand the interconnected nature of the subject areas, both with one another and with the transdisciplinary themes.

Social studies strands

What do we want students to know?

Human systems and economic activities

The study of how and why people construct organizations and systems; the ways in which people connect locally and globally; the distribution of power and authority.

Related concepts: communications, conflict, cooperation, education, employment, freedom, governments, justice, legislation, production, transportation, truth.

Social organization and culture	The study of people, communities, cultures and societies; the ways in which individuals, groups and societies interact with each other. **Related concepts:** artifacts, authority, citizenship, communication, conflict, diversity, family, identity, networks, prejudice, religion, rights, roles, traditions.
Continuity and change through time	The study of the relationships between people and events through time; the past, its influences on the present and its implications for the future; people who have shaped the future through their actions. **Related concepts:** chronology, civilizations, conflict, discovery, exploration, history, innovation, migration, progress, revolution.
Human and natural environments	The study of the distinctive features that give a place its identity; how people adapt to and alter their environment; how people experience and represent place; the impact of natural disasters on people and the built environment. **Related concepts:** amenities, borders (natural, social and political), dependence, geography, impact, landscape, locality, ownership, population, regions, settlements.
Resources and the environment	The interaction between people and the environment; the study of how humans allocate and manage resources; the positive and negative effects of this management; the impact of scientific and technological developments on the environment. **Related concepts:** conservation, consumption, distribution, ecology, energy, interdependence, pollution, poverty, sustainability, wealth.

Related concepts: While the key concepts have been identified, related concepts could provide further links to the transdisciplinary programme of inquiry or further understanding of the subject area. Here, examples of some possible related concepts have been provided for each of the strands. Schools may choose to develop their own related concepts.

Key concepts in the PYP: what do we want students to understand about social studies?

Central to the philosophy of the PYP is the principle that purposeful, structured inquiry is a powerful vehicle for learning that promotes meaning and understanding, and challenges students to engage with significant ideas. Hence in the PYP there is also a commitment to a **concept-driven curriculum** as a means of supporting that inquiry. There are clusters of ideas that can usefully be grouped under a set of overarching concepts, each of which has major significance within and across disciplines, regardless of time or place.

These key concepts are one of the essential elements of the PYP framework. It is accepted that these are not, in any sense, the only concepts worth exploring. Taken together they form a powerful curriculum component that drives the teacher- and/or student-constructed inquiries that lie at the heart of the PYP curriculum.

When viewed as a set of questions, the concepts form a research tool that is manageable, open-ended and more readily accessible to students. It is these questions, used flexibly by teachers and students when planning an inquiry-based unit, that shape that unit, giving it direction and purpose.

The following table explains each concept from both the generic perspective and the social studies perspective; a full explanation of the key concepts is found in the "Concepts: what do we want students to understand?" section.

Concept	Generic perspective	Social studies perspective
Form What is it like?	Everything has a form with recognizable features that can be observed, identified, described and categorized.	The recognizable features of individuals, groups, historical periods and environments.
Function How does it work?	Everything has a purpose, a role or a way of behaving that can be investigated.	The workings of the events, systems and relationships in societies and the natural world.
Causation Why is it like it is?	Things do not just happen. There are causal relationships at work, and actions have consequences.	The causes and effects of human and natural events.
Change How is it changing?	Change is the process of movement from one state to another. It is universal and inevitable.	The nature of human, societal and environmental change over time.
Connection How is it connected to other things?	We live in a world of interacting systems in which the actions of any individual element affect others.	The interactions that affect humans and the environment; the ways in which our past, present and future are all connected.
Perspective What are the points of view?	Knowledge is moderated by perspectives. Different perspectives lead to different interpretations, understandings and findings. Perspectives may be individual, group, cultural or disciplinary.	The ways in which humans connect knowledge and experience that lead to diverse understanding.
Responsibility What is our responsibility?	People make choices based on their understandings, and the actions they take as a result do make a difference.	People's individual and collective responsibility towards themselves, groups and the environment.
Reflection How do we know?	There are different ways of knowing. It is important to reflect on our conclusions, to consider our methods of reasoning, and the quality and reliability of the evidence we have considered.	The learning from this inquiry, and ways in which the learner can apply their new understanding.

Examples of questions that illustrate the key concepts

The following table provides sample teacher/student questions that illustrate the key concepts, and that may help to structure or frame an inquiry. These examples demonstrate broad, open-ended questioning—requiring investigation, discussion, and a full and considered response—that is essential in an inquiry-led programme.

Concept	Sample teacher/student questions
Form What is it like?	• What kinds of work did people do? • What are the main occupations of people living in the town? • What is the landscape like?
Function How does it work?	• What rules of behaviour did people adopt? • How have people adapted to living here? • How do people celebrate? • What happens to waste?
Causation Why is it like it is?	• What motivated individuals or groups to act the way they did? • What caused certain cultures to disappear? • Why did people settle here? • In what ways have conflict and its resolution shaped the society?
Change How is it changing?	• Why did things change the way they did? • In what ways does the built environment result from the natural environment? • What is the role of technology in shaping the society? • How has technology modified the natural environment? • What societal factors cause growth, migration or resource management?
Connection How is it connected to other things?	• What, if any, connections exist between society then and society today? • When a connection between two or more peoples existed, how equitable and just was it? • How have natural disasters affected the lives of people? • What kinds of beliefs, values and attitudes encourage connections with other peoples?
Perspective What are the points of view?	• How do people decide on who they want as a leader? • Might this opinion be biased? Why? • Why do people have different points of view about preserving the environment? • What might my lifestyle be if I lived in another culture?

Concept	Sample teacher/student questions
Responsibility What is our responsibility?	• Why should we care about the past? • How can we act to prevent further damage to the natural environment? • What does it mean to be a world citizen? • What rights should all children have throughout the world? • How is conflict resolved?
Reflection How do we know?	• What makes one historical source better than another? • What stereotypes do we have about this place? • Which primary sources have we used to gather data? • How reliable are our own opinions and those of others?

Overall expectations in social studies

The *Social studies scope and sequence* (2008) identifies the expectations considered appropriate in the PYP. It does this by looking at the central ideas presented in the sample programme of inquiry published in *Developing a transdisciplinary programme of inquiry* (2008) and identifying the overall understandings being developed within each age range.

These expectations (outlined here) are not a requirement of the programme. However, schools need to be mindful of practice C1.23 in the IB *Programme standards and practices* (2005) that states "If the school adapts, or develops, its own scope and sequence documents for each PYP subject area, the level of overall expectation regarding student achievement expressed in these documents at least matches that expressed in the PYP scope and sequence documents." To arrive at such a judgment, and given that the overall expectations in the *Social studies scope and sequence* (2008) are presented as broad generalities, it is recommended that schools undertake a careful consideration of their own scope and sequence document in order to identify the overall expectations in social studies for their students.

3–5 years

Students will explore their understanding of people and their lives, focusing on themselves, their friends and families, and their immediate environment. They will practise applying rules and routines to work and play. They will gain an increasing awareness of themselves in relation to the various groups to which they belong and be conscious of systems by which they organize themselves. They will develop their sense of place, and the reasons why particular places are important to people. They will also develop their sense of time, and recognize important events in their own lives, and how time and change affect people. They will explore the role of technology in their lives.

5–7 years

Students will increase their understanding of their world, focusing on themselves, their friends and families and their environment. They will appreciate the reasons why people belong to groups, the roles they fulfill and the different ways that people interact within groups. They will recognize connections within and between systems by which people organize themselves. They will broaden their sense of place and the reasons why particular places are important to people, as well as how and why people's activities influence, and are influenced by, the places in their environment. Students will start to develop an understanding of their relationship with the environment. They will gain a greater sense of time, recognizing important

events in their own lives, and how time and change affect people. They will become increasingly aware of how advances in technology affect individuals and the environment.

7–9 years

Students will extend their understanding of human society, focusing on themselves and others within their own community as well as other communities that are distant in time and place. They will investigate how and why groups are organized within communities, and the ways in which communities reflect the cultures and customs of their people. They will recognize the interdependency of systems and their function within local and national communities. They will increase their awareness of how people influence, and are influenced by, the places in their environment. Students will explore the relationship between valuing the environment and protecting it. They will extend their understanding of time, recognizing important events in people's lives, and how the past is recorded and remembered in different ways. They will broaden their understanding of the impact of advances in technology over time, on individuals, society and the environment.

9–12 years

Students will recognize different aspects of human society, focusing on themselves and others within their own community as well as groups of people that are distant in time and place. They will extend their understanding of how and why groups are organized within communities, and how participation within groups involves both rights and responsibilities. They will understand the interdependency of systems and their function within local and national communities. Students will gain an appreciation of how cultural groups may vary in their customs and practices but reflect similar purposes. They will deepen their awareness of how people influence, and are influenced by, places in the environment. They will realize the significance of developing a sense of belonging and stewardship towards the environment, valuing and caring for it, in the interests of themselves and future generations. Students will consolidate their understanding of time, recognizing how ideas and actions of people in the past have changed the lives of others, and appreciating how the past is recorded and remembered in different ways. They will gain an understanding of how and why people manage resources. They will understand the impact of technological advances on their own lives, on society and on the world, and will reflect on the need to make responsible decisions concerning the use of technologies.

Personal, social and physical education in the Primary Years Programme

Beliefs and values in personal, social and physical education

> A curriculum designed to equip students for the challenging world of the twenty-first century needs to ensure that students develop as people who take increasing responsibility for their own physical wellbeing, their own learning, their own relationships with others and their role in the local, national and global community.
>
> *Victorian Essential Learning Standards*, Victorian Curriculum and Assessment Authority, Victoria, Australia (2008)

In the PYP, personal, social and physical education (PSPE) is concerned with the individual's well-being through the promotion and development of concepts, knowledge, attitudes and skills that contribute to this well-being. Well-being is intrinsically linked to all aspects of a student's experience at school and beyond. It encompasses physical, emotional, cognitive, spiritual and social health and development, and contributes to an understanding of self, to developing and maintaining relationships with others, and to participation in an active, healthy lifestyle.

PSPE is integral to teaching and learning in the PYP and is embodied in the IB learner profile that permeates the programme and represents the qualities of internationally minded students and effective lifelong learners. As lifelong learners we strive to make sense of our lives and the world around us by constructing meaning, exploring concepts and revising understandings. Lifelong learners adopt a positive attitude to learning, develop and apply strategies for critical and creative thinking, engage in inquiry, make connections, and apply new learning and skills in different contexts. In order to become successful learners, it is necessary for students to feel empowered by their learning, to value and take responsibility for their learning, to demonstrate resilience and to develop independence. Such learners are able to reflect on themselves, their experiences, and the process of learning in order to support personal growth and their ongoing commitment to personal, social and physical well-being.

The development of a student's well-being can be implicitly and explicitly addressed through all areas of the PYP curriculum. Therefore, every teacher has a responsibility to support each student's personal, social and physical development through all learning engagements both within and outside the programme of inquiry.

The IB learner profile is integral to teaching and learning in the PYP because it represents the qualities of effective learners and internationally minded students. The learner profile, together with the five essential elements of the programme—knowledge, concepts, skills, attitudes and action—informs planning, teaching and assessing in PSPE.

Good PSPE practice

PSPE is an integral part of students' everyday life at school and at home. It is an essential part of the curriculum and, as students engage with it across and between the subject areas, they come to a deeper understanding of its relevance and applicability to their everyday lives. Appropriate attitudes and behaviours are also modelled within the school and the school community. Students learn best when the learning experiences they engage with provide them with the motivation to achieve their personal goals. PSPE promotes transdisciplinary learning through the transdisciplinary themes, the learner profile and the essential elements of the programme. Schools that have local and/or national curriculum requirements should articulate how best these can be incorporated into their planning, teaching and assessing of PSPE.

Including PSPE in an integrated approach to the curriculum guides the students' learning process in all the subject areas and beyond school. This approach provides opportunities for collective and coordinated implementation that can be communicated, understood and undertaken by the whole school community. PSPE offers an effective vehicle for opening up healthy dialogue between school and home. In this way, school and home may function as partners in education, making learning more relevant to the child and, therefore, more effective and enduring.

Regardless of whether aspects of PSPE are being taught within or outside the programme of inquiry, purposeful inquiry is still considered the principal way in which students learn best. The starting point for all learning should always be the students' prior experience and current understanding. When teachers plan learning experiences that enable students to develop personally, socially and physically, students are able to make connections, apply learning, and transfer conceptual understanding to new situations. Carefully selected children's literature can provide useful support to teaching and learning about PSPE. Stories and poems can be read to introduce new areas of learning or to provide a prompt for discussion among the students. Many of the attributes of the IB learner profile are clearly visible in a range of children's literature, and students are encouraged to recognize these attributes, as well as the attitudes, in the characters of the literature selected.

Physical education in a PYP school should be more than just student participation in sports and games. Its purpose should be to develop a combination of transferrable skills promoting physical, intellectual, emotional and social development; to encourage present and future choices that contribute to long-term healthy living; and to understand the cultural significance of physical activities for individuals and communities. Therefore, in the PYP, there should be specific opportunities for learning about movement and through movement in a range of contexts. Students of all abilities are challenged to improve their movement skills, but they are also supported and encouraged to enjoy physical activity and see it as part of a healthy and active lifestyle with connections to other areas of the curriculum and community.

A PYP teacher's personal knowledge of PSPE is of key importance. What teachers themselves understand shapes which resources they choose, what learning experiences they design and how effectively they are able to support the development of each student's well-being. The teacher's own interest is maintained, and understanding developed, through regular professional development, reading of professional journals and, especially, through regular contact with colleagues who share their commitment to teaching PSPE through inquiry. Commercially available resources should be carefully evaluated in order to ensure that they meet the needs of the teacher and the students, and the requirements of the programme.

The role of PSPE in the programme of inquiry

In the PYP, there will be opportunities for the development of personal, social and physical well-being through the relevant, realistic context of the units of inquiry as well as through teaching and learning experiences in other areas of the curriculum. Teachers have a responsibility to help students to make explicit connections between different aspects of their learning. Students need opportunities to identify and reflect on "big ideas" within and between the different strands of PSPE, the transdisciplinary themes, and other subject areas. The role of inquiry in PSPE is important as students engage in building understandings that contribute to their well-being and their success as lifelong learners.

It is acknowledged that in many schools, single-subject teachers take responsibility for the physical component of PSPE. It is vital that these single-subject teachers see themselves primarily as PYP teachers who teach physical education, and in so doing contribute to the overall outcomes of a transdisciplinary programme.

To ensure a cohesive educational experience for students, a PYP school has a responsibility to ensure that there are regular opportunities for collaboration between single-subject teachers and homeroom/classroom teachers. This collaboration includes the development and review of the school's programme of inquiry as well as planning, teaching, assessing and reflecting on units of inquiry where meaningful connections to physical education can be made. The following models provide examples of how to strengthen the role of physical education within the PYP.

- **Developing or supporting a unit within the programme of inquiry:** Whenever appropriate, physical education teachers should be involved in collaborative planning to plan, teach, assess and reflect on the units of inquiry.
- **Preparing for or following on from a unit within the programme of inquiry:** The direct teaching of physical education in a unit of inquiry may not always be feasible but, where appropriate, introductory or follow-up learning experiences may be useful to help students make connections between the different aspects of the curriculum. Physical education teachers may plan and teach activities or experiences that prepare students for participation in a unit of inquiry. Following on from a unit, students may demonstrate their understanding of the central idea in a physical education context.
- **Independent inquiry:** There may be times when teachers will be teaching aspects of physical education independent of the programme of inquiry using purposeful inquiry. At such times, teachers should structure their teaching and learning through the use of the PYP planning process. Teachers should ensure that authentic connections are made while maintaining the integrity and essential character of learning in, through and about physical education. If undertaking an inquiry outside the programme of inquiry, teachers should still recognize that the same philosophy and pedagogy must underpin their planning and teaching of the subject.

The emphasis in any unit of work, whether it is within the programme of inquiry or not, should be on the essential elements and seeking a balance between acquisition of essential knowledge and skills, development of conceptual understanding, demonstration of constructive attitudes, and taking responsible action as a result of learning.

To be effective, PSPE should be thoughtfully planned for and yet have the flexibility to include spontaneous student-driven inquiries that are not directly related to any planned units. These are valuable teaching and learning opportunities in themselves and provide teachers and students with the opportunity to apply the pedagogy of the PYP to authentic, of-the-moment situations.

All teachers working with PYP students (including the homeroom/classroom teacher and single-subject teachers) will find that the strands identified as part of PSPE will be relevant to the transdisciplinary programme of inquiry as well as to subject-specific inquiries. It is therefore imperative that all teachers in a PYP school are familiar with the area of PSPE and understand their role in the development of each student's well-being.

Examples of completed planners and a flow chart showing possible planning processes for PSPE can be found in the PYP *Personal, social and physical education scope and sequence* (2009).

How PSPE practices are changing

Structured, purposeful inquiry is the main approach to teaching and learning PSPE in the PYP. However, it is recognized that many educational innovations (or, more accurately, educational reworkings) suffer from the advocacy of a narrow, exclusive approach. The PYP represents an approach to teaching that is broad and inclusive in that it provides a context within which a wide variety of teaching strategies and styles can be accommodated, provided that they are driven by a spirit of inquiry and a clear sense of purpose.

The degree of change needed to teach PSPE in this way will depend on the individual teacher. For those teachers who have grown weary of imposed change for which they see little point, it should be stressed that teachers are not expected to discard years of hard-earned skill and experience in favour of someone else's ideas on good teaching. It is suggested, rather, that teachers engage in reflection on their own practice, both individually and in collaboration with colleagues, with a view to sharing ideas and strengths, and with the primary aim of improving their teaching to improve student learning. In doing so, they will be modelling the skills and attitudes that have been identified as essential for students.

As an aid to reflection, the following set of examples of good practice has been produced. It is believed that these examples are worthy of consideration by anyone committed to continuous improvement.

How are personal and social education practices changing?	
Increased emphasis on:	**Decreased emphasis on:**
concept-driven and transdisciplinary teaching taking place both inside and outside the programme of inquiry	teaching an isolated subject or topic
every teacher as a personal and social education teacher	the class or homeroom teacher as the sole personal and social education teacher
flexible courses of study that can include issues initiated by the students	rigid, set courses of study
different cultural, religious or social perspectives; celebrating differences	one cultural, religious or social perspective
personal and social education activities taking place throughout the school	personal and social education activities taking place only inside the classroom
parents' involvement in personal and social education learning experiences and issues	parents not being informed about personal and social education issues, or not being invited to participate in personal and social education learning experiences
empowering students to be responsible and to take action, with the teacher modelling behaviour	teaching about responsibility and the need to take action
discovering students' prior or existing beliefs, questions and concerns	instruction based on grade levels and preparation for the next academic year
challenging students to find applications for, and take action on, what they have learned	students simply learning facts and skills
the idea that what is or feels right for one person is not always right for another person	the idea that one answer or feeling is right for everyone

How are physical education practices changing?	
Increased emphasis on:	**Decreased emphasis on:**
learning that focuses on students constructing meaning, and expanding and deepening their knowledge of concepts and their understanding of the world	skill acquisition, a game or a sport as an end in itself
teachers of physical education viewed (and viewing themselves) as PYP teachers	physical education teachers seen as solely single-subject teachers
skills learned, practised and applied in the context of inquiry	skills learned and practised in isolation
rigorous activities directly linked to the concepts and driving questions of the inquiry	activities of superficial value; activities that are included only because they are fun
development of cooperative skills	acquisition of physical skills
engaging students at their own level	activities favouring skilled students
assessment/achievement based on learner profiles and attitudes.	assessment/achievement based on skill level.

Knowledge and skills in PSPE

PSPE provides the models, processes and vocabulary for handling social and personal issues, and ensuring health and well-being. Students are prepared to address moral issues in their lives and act upon a set of positive values such as appreciation, empathy and respect. They should be given guidance to help develop positive attitudes and behaviours in order to meet challenges, make healthy lifestyle choices, and serve as responsible, respectful members of society. This guidance should be specific, explicit and continuous, and should take place in a non-threatening environment.

Owing to the fact that well-being can be intrinsically linked to all aspects of a student's experience at school and beyond, PSPE should be included throughout the curriculum, wherever applicable, and in particular through opportunities found in units of the programme of inquiry.

In the *Personal, social and physical education scope and sequence* (2009), the development of overall well-being is defined through three common strands that have relevance to all teachers: **identity**, **active living** and **interactions**. These strands are concept-driven and have been designed to interact with each other, working together to support the overall development of students.

PSPE strands

What do we want students to know?

Identity

An understanding of our own beliefs, values, attitudes, experiences and feelings and how they shape us; the impact of cultural influences; the recognition of strengths, limitations and challenges as well as the ability to cope successfully with situations of change and adversity; how the learner's concept of self and feelings of self-worth affect his or her approach to learning and how he or she interacts with others.

Related concepts: autonomy, character, diversity, ethnicity, fulfillment, gender, heritage, image, initiative, perseverance, resilience, self-regulation, sexuality, spirituality, trust.

Active living

An understanding of the factors that contribute to developing and maintaining a balanced, healthy lifestyle; the importance of regular physical activity; the body's response to exercise; the importance of developing basic motor skills; understanding and developing the body's potential for movement and expression; the importance of nutrition; understanding the causes and possible prevention of ill health; the promotion of safety; rights and the responsibilities we have to ourselves and others to promote well-being; making informed choices and evaluating consequences, and taking action for healthy living now and in the future.

Related concepts: aesthetics, biomechanics, body control, body form, challenge, competition, energy, flexibility, flow, growth, goal setting, improvement, leisure, mastery, overload, physiology, power, rest, spatial awareness, strength and endurance, stress.

Interactions

An understanding of how an individual interacts with other people, other living things and the wider world; behaviours, rights and responsibilities of individuals in their relationships with others, communities, society and the world around them; the awareness and understanding of similarities and differences; an appreciation of the environment and an understanding of, and commitment to, humankind's responsibility as custodians of the Earth for future generations.

Related concepts: belonging, citizenship, community, conflict, conformity, control, culture, discrimination, fair play, interdependence, justice, leadership, peace, preservation, reparation, safety, stereotype, team work.

Related concepts: While the key concepts have been identified, related concepts could provide further links to the transdisciplinary programme of inquiry or further understanding of the subject area. Here, examples of some possible related concepts have been provided for each of the strands. Schools may choose to develop their own related concepts.

All curriculum areas provide an opportunity to utilize the transdisciplinary skills identified in figure 8 in the "Skills: what do we want students to be able to do?" section. The PSPE component of the curriculum also provides opportunities for students to:

- reflect on the development of his/her own personal, social and physical well-being
- develop and apply strategies to help manage situations of change and adversity
- work towards achieving personal goals

- master new skills and techniques in a variety of physical activities
- develop strategies to improve individual and team performance in physical activities
- understand the factors that contribute to a healthy lifestyle
- use cooperative behaviours in order to function as part of a group or team
- reflect on interactions with other people, other living things and the wider world
- appreciate the interdependent relationships between humans, other living things and the environment.

Guidance for teachers of physical education

In addition to the transdisciplinary programme of inquiry that provides authentic learning contexts for the development of well-being, it is acknowledged that many schools will develop an ongoing, balanced physical education programme. If this is the case, teachers are encouraged to draw on conceptual understandings from all three strands in order to provide meaningful, connected learning experiences for students.

The contexts selected for learning through and about movement will be different for each school, and will depend on factors such as the prior knowledge and experiences of the students; the host country of the school; the particular physical activities that are valued in the school and local community; the resources available to the school; and the kinds of experiences that the school believes will encourage present and future choices that will lead to an active healthy lifestyle. Regular exposure to all kinds of physical learning experiences will enable students to make informed choices throughout their lives. A balanced curriculum would include the following types of experiences.

- **Individual pursuits:** The development of basic motor skills and the body's capacity for movement through locomotor and manipulative skills and/or experiences; the techniques, rules and purpose of a range of athletic activities (for example, track and field, swimming, skating, skiing); recognizing a high level of achievement and how to improve a performance.
- **Movement composition:** Recognizing that movements can be linked together and refined to create a sequence of aesthetic movements. Movements can be in response to stimuli or performance elements and/or criteria and can communicate feelings, emotions and ideas (for example, gymnastics, dance*, martial arts).
- **Games:** Recognizing the challenges presented by games; the importance of manipulating space; the categorizing of games; identifying and developing appropriate skills and strategies; recognizing the importance of rules and how they define the nature of a game; modifying existing games and creating new games; teamwork.
- **Adventure challenges:** A variety of tasks requiring the use of physical and critical-thinking skills by individuals and/or groups; challenges that require groups to work together collaboratively in order to solve problems and accomplish a common goal; recognizing the role of the individual in group problem solving.
- **Health-related fitness:** Recognizing and appreciating the importance of maintaining a healthy lifestyle; the body's response to exercise including the interaction of body systems and the development of physical fitness.

***Please note:** The PYP *Arts scope and sequence* (2009) includes conceptual understandings and learning outcomes that relate specifically to dance. When the physical education programme includes dance or other creative movement experiences as a context for learning, teachers should refer to the *Personal, social and physical education scope and sequence* as well as the *Arts scope and sequence* to inform planning, teaching and assessing.

Key concepts in the PYP: what do we want students to understand about PSPE?

Central to the philosophy of the PYP is the principle that purposeful, structured inquiry is a powerful vehicle for learning that promotes meaning and understanding, and challenges students to engage with significant ideas. Hence in the PYP there is also a commitment to a **concept-driven curriculum** as a means of supporting that inquiry. There are clusters of ideas that can usefully be grouped under a set of overarching concepts, each of which has major significance within and across disciplines, regardless of time or place.

These key concepts are one of the essential elements of the PYP framework. It is accepted that these are not, in any sense, the only concepts worth exploring. Taken together they form a powerful curriculum component that drives the teacher- and/or student-constructed inquiries that lie at the heart of the PYP curriculum.

When viewed as a set of questions, the concepts form a research tool that is manageable, open-ended and more readily accessible to students. It is these questions, used flexibly by teachers and students when planning an inquiry-based unit, that shape that unit, giving it direction and purpose.

The following table explains each concept from both the generic perspective and the PSPE perspective; a full explanation of the key concepts is found in the "Concepts: what do we want students to understand?" section.

Concept	Generic perspective	PSPE perspective
Form What is it like?	Everything has a form with recognizable features that can be observed, identified, described and categorized.	The features of personal, social and physical development, including feelings, beliefs, behaviours and movements, can be observed, identified and described.
Function How does it work?	Everything has a purpose, a role or a way of behaving that can be investigated.	An examination of the feelings, beliefs and behaviours affecting our interactions with others and the environment.
Causation Why is it like it is?	Things do not just happen. There are causal relationships at work, and actions have consequences.	Our personal, social and physical well-being, as well as our relationships, are influenced by our feelings, beliefs and behaviours, and their causing factors.
Change How is it changing?	Change is the process of movement from one state to another. It is universal and inevitable.	The inevitable personal, social and physical development and change over time is influenced by intrinsic and extrinsic factors.

Concept	Generic perspective	PSPE perspective
Connection How is it connected to other things?	We live in a world of interacting systems in which the actions of any individual element affect others.	An individual's physical, emotional and social development is made up of interacting elements, including the behaviour of others and the environment.
Perspective What are the points of view?	Knowledge is moderated by perspectives. Different perspectives lead to different interpretations, understandings and findings. Perspectives may be individual, group, cultural or disciplinary.	Different perspectives of beliefs, feelings and behaviours lead to different understandings of the world, including participation in, and enjoyment of, physical activity.
Responsibility What is our responsibility?	People make choices based on their understandings, and the actions they take as a result do make a difference.	Informed and appropriate choices leading to responsible actions make a difference to our health, well-being, community and the environment.
Reflection How do we know?	There are different ways of knowing. It is important to reflect on our conclusions, to consider our methods of reasoning, and the quality and reliability of the evidence we have considered.	We constructively reflect on our feelings, beliefs, behaviours and movements to continue to develop personal, social and physical well-being.

Examples of questions that illustrate the key concepts

The following table provides sample teacher/student questions that illustrate the key concepts, and that may help to structure or frame an inquiry. These examples demonstrate broad, open-ended questioning—requiring investigation, discussion, and a full and considered response—that is essential in an inquiry-led programme.

Concept	Sample student/teacher questions	
	Personal and social education	Physical education
Form What is it like?	• Which important decisions have you made in the past? • Who works in the school and what do they do? • What are responsibilities?	• What is this movement like? • What different shapes can you make on the floor using your body? • What are the basic rules in this event/game?

Concept	Sample student/teacher questions	
	Personal and social education	Physical education
Function How does it work?	• How do rules help us to play? • How are minority groups treated by society? • Who works in the school and what do they do?	• How do we collect and record results? • How do you score points in your game? • How does this movement work?
Causation Why is it like it is?	• How do you feel when things do not work out the way you had hoped? • What things make you feel at home? • What are the things that can harm your body?	• Why does your body change when you exercise? • Why do people dance? • Why do we need rules for this game?
Change How is it changing?	• What, if anything, would you change about how you work together? • How have you changed since you were a baby? • What could you change in your lifestyle to make it more balanced?	• What changes when you exercise? • What could you change in your lifestyle to make it more balanced? • How can you make yourself into different shapes?
Connection How is it connected to other things?	• What can we learn by playing? • How is our classroom like a home? • How are rights and responsibilities connected?	• What differences are there between running for speed and running for distance? • How can you work as a group to achieve a common aim? • How can your body movements show a mood, feeling or emotion?
Perspective What are the points of view?	• What is easy/difficult about working together? • How can we understand other people's points of view and help them to understand ours? • How do people celebrate their birthdays?	• Which kind of balance equipment do you like to use best, and why? • What is easy/difficult about working together? • What can help you to improve your performance in this event/game?

Concept	Sample student/teacher questions	
	Personal and social education	Physical education
Responsibility What is our responsibility?	• What can we do to help us stay safe? • How can you be a responsible member of a group? • What rights and responsibilities do I have as I grow and change?	• How can you ensure everybody has a chance to use his or her ideas and skills? • How can you move around the space safely? • Why is it important to warm up before exercising?
Reflection How do we know?	• How do we identify situations that are potentially unsafe? • How do I know I am growing and changing? • How have you been influenced by your family history?	• How can you evaluate your performance? • Why is it necessary to create a space in dance? • How would you change the rules of the game?

Overall expectations in PSPE

The *Personal, social and physical education scope and sequence* (2009) aims to provide information for the whole school community of the learning that is going on in PSPE. It has been designed in recognition of the fact that learning is a developmental process and that the phases a learner passes through are not always linear or age related. For this reason the content is presented in continuums for each of the three **strands** of PSPE—identity, active living, and interactions. For each of the strands there is a strand description and a set of **overall expectations**. The overall expectations provide a summary of the conceptual understandings and subsequent learning being developed in each phase within a strand.

These expectations (outlined here) are not a requirement of the programme. However, schools need to be mindful of practice C1.23 in the IB *Programme standards and practices* (2005) that states, "If the school adapts, or develops its own scope and sequence documents for each PYP subject area, the level of overall expectation regarding student achievement expressed in these documents at least matches that expressed in the PYP scope and sequence documents." To arrive at such a judgment, and given that the overall expectations in the *Personal, social and physical education scope and sequence* (2009) are presented as broad generalities, it is recommended that the entire document be read and considered.

Identity

Phase 1

Learners have an awareness of themselves and how they are similar and different to others. They can describe how they have grown and changed, and they can talk about the new understandings and abilities that have accompanied these changes. They demonstrate a sense of competence with developmentally appropriate daily tasks and can identify and explore strategies that help them cope with change. Learners reflect on their experiences in order to inform future learning and to understand themselves better.

Phase 2

Learners understand that there are many factors that contribute to a person's identity and they have an awareness of the qualities, abilities, character and characteristics that make up their own identity. They are able to identify and understand their emotions in order to regulate their emotional responses and behaviour. Learners explore and apply different strategies that help them approach challenges and new situations with confidence.

Phase 3

Learners understand that a person's identity is shaped by a range of factors and that this identity evolves over time. They explore and reflect on the strategies they use to manage change, approach new challenges and overcome adversity. They analyse how they are connected to the wider community and are open to learning about others. Learners use their understanding of their own emotions to interact positively with others. They are aware that developing self-reliance and persisting with tasks independently will support their efforts to be more autonomous learners.

Phase 4

Learners understand that the physical changes they will experience at different stages in their lives affect their evolving identities. They understand that the values, beliefs and norms within society can impact on an individual's self-concept and self-worth. Learners understand that being emotionally aware helps them to manage relationships. They recognize and describe how a sense of self-efficacy contributes to human accomplishments and personal well-being. Learners apply and reflect on strategies that develop resilience and, in particular, help them to cope with change, challenge and adversity in their lives.

Active living

Phase 1

Learners show an awareness of how daily practices, including exercise, can have an impact on well-being. They understand that their bodies change as they grow. They explore the body's capacity for movement, including creative movement, through participating in a range of physical activities. Learners recognize the need for safe participation when interacting in a range of physical contexts.

Phase 2

Learners recognize the importance of being physically active, making healthy food choices, and maintaining good hygiene in the development of well-being. They explore, use and adapt a range of fundamental movement skills in different physical activities and are aware of how the body's capacity for movement develops as it grows. Learners understand how movements can be linked to create sequences and that these sequences can be created to convey meaning. They understand their personal responsibilities to themselves and others in relation to safety practices.

Phase 3

Learners understand the factors that contribute to a healthy lifestyle. They understand that they can enhance their participation in physical activities through developing and maintaining physical fitness, refining movement skills, and reflecting on technique and performance. Learners are able to identify different stages of life and understand that rates of development are different for everyone. Learners understand that there are potential positive and negative outcomes for risk-taking behaviours and are able to identify these risks in order to maximize enjoyment and promote safety.

Phase 4

Learners understand the interconnectedness of the factors that contribute to a safe and healthy lifestyle, and set goals and identify strategies that will help develop well-being. They understand the physical, social and emotional changes associated with puberty. They apply movement skills appropriately, and develop plans to help refine movements, improve performance and enhance participation in a range of physical contexts.

Interactions

Phase 1

Learners interact, play and engage with others, sharing ideas, cooperating and communicating feelings in developmentally appropriate ways. They are aware that their behaviour affects others and identify when their actions have had an impact. Learners interact with, and demonstrate care for, local environments.

Phase 2

Learners recognize the value of interacting, playing and learning with others. They understand that participation in a group can require them to assume different roles and responsibilities and they show a willingness to cooperate. They nurture relationships with others, sharing ideas, celebrating successes and offering and seeking support as needed. Learners understand that responsible citizenship involves conservation and preservation of the environment.

Phase 3

Learners understand that group work can be enhanced through the development of a plan of action and through identifying and utilizing the strengths of individual group members. Learners reflect on the perspectives and ideas of others. They understand that healthy relationships are supported by the development and demonstration of constructive attitudes towards other people and the environment.

Phase 4

Learners understand that they can experience intrinsic satisfaction and personal growth from interactions with others in formal and informal contexts. They understand the need for developing and nurturing relationships with others and are able to apply strategies independently to resolve conflict as it arises. They recognize that people have an interdependent relationship with the environment and other living things and take action to restore and repair when harm has been done.

Arts in the Primary Years Programme

Beliefs and values in the arts

> The arts are not mere diversions from the important business of education; they are **essential** resources.
>
> Elliot W Eisner, "The Role of the Arts in Cognition and Curriculum" (2001)

Arts are integral to the PYP. They are a powerful mode of communication through which students explore and construct a sense of self and develop an understanding of the world around them. Arts provide students with a wide range of opportunities and means to respond to their experiences and engage with historical, social and cultural perspectives. The students are stimulated to think and to articulate their thoughts in new ways, and through a variety of media and technologies. The PYP recognizes that not all learning can be supported solely through language, and that arts as a medium of inquiry also provide opportunities for learning, communication and expression. Learning about and through arts is fundamental to the development of the whole child, promoting creativity, critical thinking, problem-solving skills and social interactions.

In the PYP, arts are identified as dance, drama, music and visual arts. Each of these arts is a significant discipline in its own right, but the transdisciplinary nature of arts gives them relevance throughout the curriculum. Arts promote attitudes such as empathy and appreciation, and skills such as analysis, that help us to see the uniqueness of each person as well as explore the commonalities that connect us. Work in arts is a way of conveying meaning, sharing a culture, developing one's sense of self, and expanding knowledge. It provides opportunities to reflect on aesthetic experience, to engage the imagination and explore what is uncertain. Through engaging with and creating artworks, learners are encouraged to reconsider familiar concepts and think about issues of culture and identity. By responding to the work of other artists, they are invited to situate their own creativity within a broader context.

In our rapidly changing digital age, students inhabit a world saturated with images, sounds and performances. Students in the PYP continually explore imaginative uses of new media tools beyond their basic functional applications, discovering alternative or individual ways to conceptualize the role of digital technologies in their lives. The arts develop innovative thinking and creative use of technologies, and in so doing prepare students to participate fully in this multifaceted world.

The IB learner profile is integral to teaching and learning arts in the PYP because it represents the qualities of effective learners and internationally minded students. The learner profile, together with the five essential elements of the programme—knowledge, concepts, skills, attitudes and action—informs planning, teaching and assessing in the arts.

Good arts practice

Arts engage students in creative processes through which they explore and experiment in a continual cycle of action and reflection. Such creative processes are seen by the PYP as the driving force in learning through inquiry. From an early age, students have the opportunity to develop genuine interests, to give careful consideration to their work and to become self-critical and reflective. Reflecting on and evaluating their own work and the work of others is vital, and empowers students to take intellectual risks. Exposure to and experience with arts opens doors to questions about life and learning. The process of making and appreciating arts is gratifying and will encourage students to continue creating throughout their lives.

Students draw on a wide range of stimuli: the creative works of professional artists; contemporary and historical literature; music, artwork, dance and stories. Dance, drama, music and visual artwork develop naturally from students' own imaginations, observations, real-life experiences, feelings, values and beliefs. Introducing issues and concepts through appropriate media gives them meaning and allows students to take ownership of them. Evidence of students' learning will be seen in their willingness and ability to take action in order to make a difference in the world.

A PYP teacher's personal knowledge of the arts is of key importance. What teachers themselves understand shapes which resources they choose, what learning experiences they design and how effectively they teach. The teacher's own interest in, and development of, the disciplines of dance, drama, music or visual art is maintained through regular professional development, reading of professional journals and, especially, through regular contact with colleagues who share their commitment to teaching arts through inquiry. Commercially available resources for teaching arts are carefully evaluated to ensure that they meet the needs of the teacher and the students, and the requirements of the programme.

The following information provides more specific guidance on how to put arts into practice in the PYP, with particular reference to each of the different art forms.

Dance

Dance is an integral part of many cultures. Dance plays an important role in society as it brings people and communities together. As an art form, dance explores how we express ourselves through movement. To understand and respond to dance, students need to understand how dance is used in cultural, ritual and social contexts. Students need opportunities to view a wide variety of dance from various sources, such as live performance, peer choreography, guest dance artists, and recordings. Dance as an art form has evolved considerably over the past century. Exploring dance in a historical and cultural context, and in a variety of genres, enriches the student's experience in creating and responding to dance.

Creating dance involves inquiring into the rhythm of music, the natural rhythms of our bodies, and the environment around us. Students should have the opportunity to discover their own motivations and influences to inspire their movements. Through ensemble work, students can develop their ability to cooperate with others.

Dance uses the body as the medium of expression. Students need to develop confidence in their personal physicality through body awareness, balance, coordination, flexibility and strength. The physical nature of dance creates a strong link with the strands in the *Personal, social and physical education scope and sequence* (2009).

Teachers can offer students experiences that may provoke and inspire them through exposing them to dance performance. By creating a safe environment for students to express themselves, teachers can draw on their students' creativity with movement. Dance should be woven throughout the curriculum as a visual language and kinesthetic medium for students.

Dance is a living expression that takes place in the present. However, whenever possible it is important to document the inspiration and the process of creating movement. Digital recording can be used to capture moving images of dance. Photographs and sketches can be used as tools for planning a dance project. Building a dance vocabulary to describe movement can help to document the dance process verbally or through notation.

Information and communication technology (ICT) can be used to document the process of creating dance as well as to enhance the performance. Designing the stage with lighting and integrating video with live performance can add dimension to a dance project. Using a variety of tools, students can create their own music or generate and record sounds and words.

Dance requires a physical space in which to move. More importantly, it needs a trusting and positive environment. Nurturing physical confidence calls for an atmosphere where students feel safe to engage fully their minds and bodies.

Drama

Drama explores how we express ourselves physically and vocally. In creating, students should explore the use of facial expressions, gestures, movement, posture and vocal techniques to convey emotional or cultural meaning to both characters and stories. It is important that students are exposed to a variety of dramatic forms including creative movement, impersonation, improvisation, mask work, mime, musical, role play, pantomime, puppetry, re-enactment, scripted drama, and skit. In responding, students should experience a wide variety of scripts and stories from different times, cultures and places and, where possible, access live theatre performances and presentations. Students should have opportunities to present their creative work to an audience, to witness their peers in performance and through this become critically aware audience members.

In drama, documenting the individual's learning process is integral. Drama is an active and transitory discipline, thus digitally recording performances or class project work provides both the student and teacher with tools for reflection. Through carefully planned exercises students can creatively explore personal interests and begin to develop their own style. Journal work (whether scrapbook-style or written), illustrating storylines, scriptwriting, set designs and costume choices are indicators of students' dramatic development and can provide an informative record of their personal creative journey.

All dramatic activities require room to move. An adequately large, clear space is required to explore movement and drama games. This space allows the class the freedom to create make-believe environments through the manipulation of objects, including sounds and lights. Thus access to an inventory of craft material, props, costumes, set pieces, rostrums and lighting would be beneficial to the creative experience.

ICT can be used in drama settings as a tool to enhance the creative experience. Word processing, scriptwriting and storyboarding programs can help the student to develop scenes and write plays. Students can also mix sound effects and music on audio programs to create soundtracks for performances. Dramatic work can be filmed and uploaded to a computer to be edited using video-editing software.

Music

Music enables students to communicate in ways that go beyond their oral language abilities. Music delights and stimulates, soothes and comforts us; music allows students to communicate in a unique way. Musical experiences and learning begin with the voice. It is important that students are given opportunities to discover a broad range of music experiences including classifying and analysing sounds, composing, exploring body music, harmonizing, listening, playing instruments, singing, notation, reading music, songwriting and recording. In **creating**, students use their imagination and musical experiences to organize sounds—natural and technological—into various forms that communicate specific ideas or moods. In **responding**, students are given the opportunity to respond to different styles of music, as well as to music from different times and cultures. Individually and collaboratively, students should have the opportunity to create and respond to music ideas. By exposing students to a wide and varied repertoire of musical styles, they can begin to construct an understanding of their environment, their surroundings and structures, and begin to develop personal connections with them.

Music is a part of everyday life. Listening to and performing music can be a social activity. The development of listening skills, an important aspect of all learning, is constantly reinforced. Teachers should be aware that music plays an important part in the language learning process. Through songs and rhymes, students can hear patterns and develop a sense of the rhythm that applies to languages. This can be especially apparent when learning a new language because the meaning of the words is not necessarily understood, and so students concentrate on the rhythms and patterns they hear. Wherever possible, teachers should try to include rhymes and songs in their teaching activities, not just in designated music classes.

Music is both an active and reflective process when making and listening to it. Students can draw on a wide range of sources in their music learning: music composed by themselves and other students; music composed by musicians; literature; paintings; dance; their own imagination; real-life experiences; feelings; values and beliefs. They should be exposed to live performances as well as recordings. Additionally, the opportunity to participate in live performances—informal as well as formal—allows students to work collaboratively and gain awareness of the audience.

A PYP music classroom provides an environment that stimulates and challenges students. It is well resourced with an extensive range of music recordings, videos and instruments. Students have the opportunity to explore home-made as well as manufactured instruments from a variety of countries and cultures. ICT can influence and enhance learning in music by allowing students to create, compose and record their work as well as listen to, observe and share music through the use of CDs and music files.

Visual arts

The term "visual arts" is used to describe practices that have been more traditionally described in education as "art, craft and design". It is important that students are exposed to a broad range of experiences that illustrate the field of visual arts, including architecture, bookmaking, ceramics, collage, costume design, drawing, graphic design, film, illustration, industrial design, installation, jewellery, land art, mask making, metalwork, painting, papermaking, performance art, photography, printmaking, sculpture, set design, textiles and woodwork.

Wherever possible, students should have the opportunity to experience visual arts beyond their own initial involvement. This may be achieved by inviting artists into the school, or by visiting art galleries, museums, artists' and designers' studios, exhibitions, films sets and/or theatres. Students will begin to appreciate the depth and breadth of the field by experiencing visual arts created by diverse artists—locally and globally, now and in the past, by women and men, and by people of different backgrounds.

In visual arts, the role of the sketchbook is integral to this process. The sketchbook provides a space for students to take ownership of their learning, to creatively explore personal interests and to develop their own style. The PYP recognizes the range of forms a sketchbook may take, reaching beyond the physical book to possibly include new media, sound and film.

ICT can be used in the visual arts classroom as a tool to enhance the creative experience. Photo and film editing, animation, web design, drawing, computer-aided design, audio and word processing programs can be used as tools to engage students with the conceptual understandings detailed in the continuums.

Visual arts activities require space, tools, materials and ICT tools. Ideally, an adequately large, well-resourced environment is desirable to explore a range of visual arts practices. Beyond the physical space, it is important to establish a constructive and positive learning environment conducive to the creative experience.

The role of arts in the programme of inquiry

Arts in the PYP exemplify learning through inquiry because of the emphasis on, and the nature of, the creative process. Arts provide a unique vehicle to enhance the understanding of the transdisciplinary themes by providing both students and teachers with a range of mediums with which to access the units of inquiry. Arts support the acquisition of essential knowledge and skills, the development of conceptual understanding, the demonstration of positive attitudes, and the taking of action. It is the school's responsibility to find opportunities to infuse arts teaching and learning in all areas of the curriculum that are relevant to the community of learners and reflect the educational theories underpinning the programme.

The school's programme of inquiry provides a relevant and authentic context for students to create and respond to arts. Wherever possible, arts should be taught through the units of inquiry and should support students' inquiries. The direct teaching of arts in a unit of inquiry may not always be feasible. However, teachers have a responsibility to help students to make explicit connections between different aspects of

their learning. Students need opportunities to identify and reflect on "big ideas" within and between the arts strands, the programme of inquiry, and other subject areas. The role of inquiry in arts is important as students engage in building understanding of these links and arts in the world.

It is acknowledged that in many schools, single-subject teachers take responsibility for the different arts areas. It is vital that these teachers see themselves primarily as PYP teachers who teach arts, and in so doing contribute to the overall outcomes of a transdisciplinary programme. To ensure a cohesive educational experience for students, a PYP school has a responsibility to make sure that there are regular opportunities for collaboration between single-subject teachers and homeroom/classroom teachers. This collaboration includes the development and review of the school's programme of inquiry, as well as planning, teaching, assessing and reflecting on individual units of inquiry. The following models provide examples of how to strengthen the role of learning through and about arts in the PYP.

- **Developing or supporting a unit within the programme of inquiry:** Whenever appropriate, arts teachers should be involved in collaborative planning to teach, assess and reflect on the units of inquiry.
- **Preparing for or following on from a unit within the programme of inquiry:** The direct teaching of arts in a unit of inquiry may not always be feasible but, where appropriate, introductory or follow-up learning experiences may be useful to help students to make connections between the different aspects of the curriculum. Arts teachers may plan and teach activities or experiences that prepare students for participation in a unit of inquiry. Following on from a unit, students may demonstrate their understanding of the central idea in an arts context. Indeed, an arts activity may be incorporated into the summative assessment of the unit.
- **Independent arts inquiry:** There may be times when teachers will be teaching aspects of arts independent of the programme of inquiry. At such times, teachers should structure their teaching and learning through the use of the PYP planning process. Teachers should ensure that the essential elements of the PYP support such learning while maintaining the integrity and character of learning through and about arts. If undertaking an inquiry outside the programme of inquiry, teachers should still recognize that the same philosophy and pedagogy must underpin their planning and teaching of the subject.

It is worthwhile to note that there will be occasions that present themselves for student-initiated, spontaneous arts inquiries that are not directly related to any planned units of inquiry. These are valuable teaching and learning opportunities in themselves and provide teachers and students with the opportunity to apply the pedagogy of the PYP to authentic, of-the-moment situations.

It is imperative that all teachers in a PYP school are familiar with the PYP *Arts scope and sequence* (2009) and understand their role in the student's artistic development. All teachers (including the single-subject teacher and homeroom/classroom teacher) will find that the strands identified as part of arts in the PYP will be relevant to the transdisciplinary programme of inquiry as well as to subject-specific teaching.

Regardless of whether arts are being taught within or outside the programme of inquiry, it is believed that purposeful inquiry is the best way to learn. The starting point should always be students' prior experiences and current understanding. When teachers plan learning experiences that enable students to develop artistically, students are able to make connections, apply their learning, and transfer their conceptual understanding to new situations. This progressive conceptual development, together with an enjoyment of the process, provides the foundation for lifelong learning.

Examples of completed planners and a flowchart of possible planning processes for arts can be found in the *Arts scope and sequence* (2009).

How arts practices are changing

Structured, purposeful inquiry is the main approach to teaching and learning arts in the PYP. However, it is recognized that many educational innovations (or, more accurately, educational reworkings) suffer from the advocacy of a narrow, exclusive approach. The PYP represents an approach to teaching that is broad and inclusive in that it provides a context within which a wide variety of teaching strategies and styles can be accommodated, provided that they are driven by a spirit of inquiry and a clear sense of purpose.

The degree of change needed to teach arts in this way will depend on the individual teacher. For those teachers who have grown weary of imposed change for which they see little point, it should be stressed that teachers are not expected to discard years of hard-earned skill and experience in favour of someone else's ideas on good teaching. It is suggested, rather, that teachers engage in reflection on their own practice, both individually and in collaboration with colleagues, with a view to sharing ideas and strengths, and with the primary aim of improving their teaching to improve student learning. In doing so, they will be modelling the skills and attitudes that have been identified as essential for students.

As an aid to reflection, the following set of subject-specific examples of good practice has been produced. It is believed that these examples are worthy of consideration by anyone committed to continuous improvement.

How are arts practices changing?	
Increased emphasis on:	**Decreased emphasis on:**
collaborative planning and dialogue with classroom teachers and other single-subject teachers	individual planning in isolation from other teachers
arts teachers involved with the process of developing the units of inquiry and defining the central idea	classroom teachers developing the units of inquiry and defining the central ideas that are disseminated to arts teachers
planning for a conceptual understanding	thematic planning: for example, working on a play, composition, dance or a piece of visual art that is connected to a particular theme or topic
arts teachers viewed (and viewing themselves) as PYP teachers	arts teachers seen as solely single-subject teachers
students working, observing and performing in different areas of the school and community	students remaining at all times in the arts rooms for lessons
arts as an avenue to inquiry	arts supporting other areas of the PYP
a variety of modalities, activities, assessments and artistic experiences	a textbook-driven arts curriculum
students exposed to arts from multiple cultures, genres, time periods and languages	students allowed access only to arts from a single culture
students' questions directing arts projects, and individual creativity valued and encouraged	teacher-led arts projects

How are arts practices changing?	
Increased emphasis on:	**Decreased emphasis on:**
deeper understanding of concepts behind artistic experiences	superficial use of artistic conventions
assessing students' understanding regularly through all stages of the creative process, as well as the final product.	assessment of the end product or performance only.

Knowledge and skills in the arts

Arts are built into the curriculum as essential areas of learning. Students are required to engage in a range of performing arts (dance, drama, music) and visual arts experiences. Please note that specific arts teachers are not necessarily required, although some teachers may have specific responsibilities in the arts. Issues related to school size, organization and staffing will determine the structuring of arts components of the programme.

Two common strands—**creating** and **responding**—have been identified that apply across the different art forms and define the critical artistic processes. These intrinsically connected strands are concept-driven and have been designed to interact with each other, working together to support the overall development of the students. Between each of these interconnected strands, there should be a balance between the acquisition of knowledge and skills, and the development of conceptual understanding. Students should be made aware of the inevitable links to other areas of the curriculum in order to understand the interconnected nature of the subject areas, with one another and with the transdisciplinary themes.

All curriculum areas provide an opportunity to utilize the transdisciplinary skills identified in figure 8 in the "Skills: what do we want students to be able to do?" section. The arts component of the curriculum also provides opportunities for students to:

- develop proficiency as dancers, actors, musicians and visual artists
- acquire audience skills such as listening and viewing responsively
- interpret and present their own or others' works to a range of audiences
- evaluate the different roles of artists in society such as to entertain, provoke debate or challenge views and perceptions
- create and critique choreographed performance, plays, compositions and artwork using a selection of tools and techniques
- express feelings, ideas, experiences and beliefs in a variety of ways
- improve coordination, flexibility, agility, strength and fine motor skills.

Arts strands

What do we want students to know?

Responding

The process of *responding* provides students with opportunities to respond to their own and other artists' works and processes, and in so doing develop the skills of critical analysis, interpretation, evaluation, reflection and communication. Students will demonstrate knowledge and understanding of the concepts, methods and elements of dance, drama, music and visual arts, including using specialized language. Students consider their own and other artists' works in context and from different perspectives in order to construct meaning and inform their own future works and processes.

The *responding* strand is not simply about reflecting; responding may include creative acts and encompasses presenting, sharing and communicating one's own understanding. By responding to their own artwork and that of others, students become more mindful of their own artistic development and the role that arts play in the world around them.

Creating

The process of *creating* provides students with opportunities to communicate distinctive forms of meaning, develop their technical skills, take creative risks, solve problems and visualize consequences. Students are encouraged to draw on their imagination, experiences and knowledge of materials and processes as starting points for creative exploration. They can make connections between their work and that of other artists to inform their thinking and to provide inspiration. Both independently and collaboratively, students participate in creative processes through which they can communicate ideas and express feelings. The *creating* strand provides opportunities for students to explore their personal interests, beliefs and values and to engage in a personal artistic journey.

Related concepts: There are many related concepts that could provide further links to the transdisciplinary programme of inquiry or further understanding of the subject area. Related concepts, such as interpretation, performance, imagination and techniques, have been embedded into the descriptions for each of the strands above. Schools may choose to develop further related concepts.

Key concepts in the PYP: what do we want students to understand about the arts?

Central to the philosophy of the PYP is the principle that purposeful, structured inquiry is a powerful vehicle for learning that promotes meaning and understanding, and challenges students to engage with significant ideas. Hence in the PYP there is also a commitment to a **concept-driven curriculum** as a means of supporting that inquiry. There are clusters of ideas that can usefully be grouped under a set of overarching concepts, each of which has major significance within and across disciplines, regardless of time or place.

These key concepts are one of the essential elements of the PYP framework. It is accepted that these are not, in any sense, the only concepts worth exploring. Taken together they form a powerful curriculum component that drives the teacher- and/or student-constructed inquiries that lie at the heart of the PYP curriculum.

When viewed as a set of questions, the concepts form a research tool that is manageable, open-ended and more readily accessible to students. It is these questions, used flexibly by teachers and students when planning an inquiry-based unit, that shape that unit, giving it direction and purpose.

The following table explains each concept from both the generic perspective and the arts perspective; a full explanation of the key concepts is found in the "Concepts: what do we want students to understand?" section.

Concept	Generic perspective	Arts perspective
Form What is it like?	Everything has a form with recognizable features that can be observed, identified, described and categorized.	Arts are a form of communication that allows us to convey ideas, feelings and concepts to an audience through visual art, music, words, movements and expressions.
Function How does it work?	Everything has a purpose, a role or a way of behaving that can be investigated.	Arts use creativity to convey a message that can be practical, educational, cultural or personal. A relationship is developed between the artist and the audience whereby informed opinions or choices may be made.
Causation Why is it like it is?	Things do not just happen. There are causal relationships at work, and actions have consequences.	Arts are a creative, emotional and thoughtful interpretation of the world; they are influenced by cultural and personal experience.
Change How is it changing?	Change is the process of movement from one state to another. It is universal and inevitable.	Arts are never static. As the world changes, the methods and means of arts must evolve with it. Experiences in arts will alter according to the interpretations of the participant or the audience.
Connection How is it connected to other things?	We live in a world of interacting systems in which the actions of any individual element affect others.	Arts are a universal language by which we can communicate within and across cultures and time periods.
Perspective What are the points of view?	Knowledge is moderated by perspectives. Different perspectives lead to different interpretations, understandings and findings. Perspectives may be individual, group, cultural or disciplinary.	Arts allow for the opportunity of creative choice. Different points of view naturally arise depending on whether an individual is creating or composing, performing or displaying, viewing or listening.

Concept	Generic perspective	Arts perspective
Responsibility What is our responsibility?	People make choices based on their understandings, and the actions they take as a result do make a difference.	Arts convey a powerful message to an audience, and we must be aware that our interpretations can affect others. We must also take an active role in preserving the arts and creating an awareness and appreciation of arts from all cultures.
Reflection How do we know?	There are different ways of knowing. It is important to reflect on our conclusions, to consider our methods of reasoning, and the quality and reliability of the evidence we have considered.	We consciously reflect on, evaluate and describe how we have expressed ourselves through the acquisition of the elements of dance, drama, music and visual art. We also reflect on the performance of others in the pursuit of self-improvement.

Examples of questions that illustrate the key concepts

The following table provides sample teacher/student questions that illustrate the key concepts, and that may help to structure or frame an inquiry. These examples demonstrate broad, open-ended questioning—requiring investigation, discussion, and a full and considered response—that is essential in an inquiry-led programme.

Concept	Sample teacher/student questions			
	Dance	Drama	Music	Visual arts
Form What is it like?	• What makes this dance unique? • What is the story in this dance performance?	• What was the performance about? • How might this character move?	• What makes a song a folk song? • What sounds do you hear in this music?	• Why have you chosen that material/tool? • How would you describe the way the elements of art have been used in this painting?
Function How does it work?	• How will you move in response to this music? • How might you show your feelings through movement?	• How can you show what you are feeling? • How can you create the sounds of the beach using your voice?	• What sounds can you make with this instrument? • What does this sign/symbol tell us to sing?	• How can you show yourself feeling angry/sad/happy/frightened? • How is colour used in advertising?

Concept	Sample teacher/student questions			
	Dance	Drama	Music	Visual arts
Causation Why is it like it is?	• What is the relationship between the beginning and the ending of this dance performance? • How does the environment impact on your dance?	• Why did the characters behave in this way? • Who was your favourite character and why?	• Why is a steady beat important in an ensemble performance? • What culture do you think this music comes from?	• Why do you think this piece of art has been made? • Why do you think people visit art galleries?
Change How is it changing?	• What differences did you notice between the rehearsal and the final dance performance? • How can you utilize space when improvising?	• How can constructive criticism improve your performance? • How does the story begin, develop and end?	• What would happen to a song if the tempo went from allegro to largo? • How is a musical variation different from the theme?	• Why and how do fashions change over time? • How has new media influenced artistic practices?
Connection How is it connected to other things?	• How does dance provide a link between cultures? • How will you use peer feedback to improve your performance?	• How is watching a live show similar to/ different from watching TV? • How can we find out about our past through stories?	• How does the size of the instrument relate to the pitch of the instrument? • In what types of celebrations would you hear this music?	• How does art help us celebrate? • What do the colours and shapes remind you of?
Perspective What are the points of view?	• How did you feel after watching a ballet? • Which movements are easier to learn?	• Which character did you identify with, and why? • How do you think that character is feeling now?	• Which instruments would you choose to play this pattern or song, and why? • How does this music make you feel?	• How do you think this flower would look if you were the size of an ant? • How does someone's culture influence the work they produce?

Concept	Sample teacher/student questions			
	Dance	Drama	Music	Visual arts
Responsibility What is our responsibility?	• What do you need to do to prepare for this movement composition? • Which movements are safe for all members of the group?	• In what ways can you help the group to complete the task? • How does your interpretation of the character reflect the intention of the playwright?	• What can each musician in a group do to make a good performance? • How can we look after this instrument?	• Who do you need to speak to and involve in this project, and why? • Which materials do you think can be recycled into art, and why?
Reflection How do we know?	• How can dance help us to learn more about a different culture? • How will you use the criteria to improve your dance?	• How can you show what you have learned? • How can we solve a problem when we have different points of view?	• Did you make a good choice of instruments or sound sources for your piece? Why, or why not? • Why is the tempo of this song appropriate for the mood and the words of the piece?	• Are these materials the best ones for your task, and why? • What makes an interesting design?

Overall expectations in arts

The *Arts scope and sequence* (2009) has been designed to recognize that learning in arts is a developmental process and that the phases through which a learner passes are not always linear or age related. For this reason the content is presented in continuums for each of the two **strands** of arts: responding and creating. For each of the strands there is a strand description and a set of **overall expectations**. The overall expectations provide a summary of the understandings and subsequent learning being developed in each phase within a strand.

The content of each continuum has been organized into four **phases** of development that aim to describe arts learning relevant to students in a PYP school. It is acknowledged that there are earlier and later phases than those described in this document. Teachers should ensure that they continue to build on understanding developed in the earlier phases while introducing the new concepts, knowledge and skills detailed in the later phases.

The continuums make explicit the **conceptual understandings** that are being developed at each phase. The development of these understandings is supported by the **learning outcomes** associated with each phase. The learning outcomes are written as observable behaviours or actions that will indicate to teachers how students are constructing, creating and sharing meaning through arts. They are, therefore, both diagnostic tools and a means of informing planning for further development.

The scope and sequence also identifies the overall expectations considered appropriate in the PYP. These overall expectations (outlined here) are not a requirement of the programme. However, schools need to

be mindful of practice C1.23 in the IB *Programme standards and practices* (2005) that states "If the school adapts, or develops, its own scope and sequence documents for each PYP subject area, the level of overall expectation regarding student achievement expressed in these documents at least matches that expressed in the PYP scope and sequence documents." To arrive at such a judgment, and given that the overall expectations in the *Arts scope and sequence* (2009) are presented as broad generalities, it is recommended that schools undertake a careful consideration of their own scope and sequence document in order to identify the overall expectations in arts for their students.

Responding

Phase 1

Learners show an understanding that the different forms of arts are forms of expression to be enjoyed. They know that dance, drama, music and visual arts use symbols and representations to convey meaning. They have a concept of being an audience of different art forms and display awareness of sharing art with others. They are able to interpret and respond to different art forms, including their own work and that of others.

Phase 2

Learners show an understanding that ideas, feelings and experiences can be communicated through arts. They recognize that their own art practices and artwork may be different from others. They are beginning to reflect on and learn from their own stages of creating artworks. They are aware that arts may be created with a specific audience in mind.

Phase 3

Learners show an understanding that issues, beliefs and values can be explored in arts. They demonstrate an understanding that there are similarities and differences between different cultures, places and times. They analyse their own work and identify areas to revise to improve its quality. They use strategies, based on what they know, to interpret arts and understand the role of arts in our world.

Phase 4

Learners show an understanding that throughout different cultures, places and times, people have innovated and created new modes in arts. They can analyse different art forms and identify common or recurring themes or issues. They recognize that there are many ways to enjoy and interpret arts. They accept feedback from others.

Creating

Phase 1

Learners show an understanding that they can express themselves by creating artworks in dance, drama, music and visual arts. They know that creating in arts can be done on their own or with others. They are aware that inspiration to create in arts comes from their own experiences and imagination. They recognize that they use symbols and representations to convey meaning in their work.

Phase 2

Learners show an understanding that they can use arts to communicate their ideas, feelings and experiences. They use strategies in their work to enhance the meaning conveyed and to make it more enjoyable for others. They are aware that their work can provoke different responses from others. They understand the value of working individually and collaboratively when creating different art forms.

Phase 3

Learners show that, as artists, they can influence thinking and behaviour through the arts they create. They think critically about their work and recognize that their personal interests, beliefs and values can inform their creative work. They show an understanding of the relationships between their work and that of others.

Phase 4

Learners show an understanding that their own creative work in dance, drama, music and visual arts can be interpreted and appreciated in different ways. They explore different media and begin to innovate in arts. They consider the feedback from others in improving their work. They recognize that creating in arts provides a sense of accomplishment, not only in the process, but also in providing them with a way to understand the world.